USER'S MANUAL

Meteorite Data Retrieval Program
Microsoft Windows Version 7.2

MetBase User's Manual
Version 7.2 for Microsoft Windows™

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Chapter 1: Introduction

Main features

MetBase is a meteorite data retrieval program. The database contains more than 750,000 field entries with data on find and fall locations, weights, pairing names and synonyms, classifications, shock and weathering categories, chemical analyses, noble gas isotopes, cosmogenic radionuclides, and repositories of material and prepared sections. *MetBase* also provides basic meteorite descriptions, information on find circumstances and more than 79,000 references to literature. You can view the basic information on every known meteorite or you can print the catalogues of more than 650 meteorite collections with altogether over 65,000 specimen weights that are stored in *MetBase*. Data can be extracted by using the query utility and the retrieved information can be printed or exported to other programs.

***MetBase* is a read-only program. It does not provide the user with the ability to add, delete or alter contained data.** The *MetBase* database is being updated on a regular basis

MetBase support

If you have a question about *MetBase*, first look in this product documentation or consult the online help. If you cannot find the answer, contact the Support.

We would like to hear your comments about the *MetBase* program. Help us make future versions of *MetBase* even better by giving us a call, sending us a fax or dropping us a note. We will be sure to consider your feedback in developing future versions of *MetBase*. We would be very pleased to receive any note from you also regarding the data stored in *MetBase*. There will inevitably be omissions and mistakes. Corrections and new information are therefore very welcomed for incorporation in the next edition.

MetBase service and support:

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Benquestrasse 27
D-28209 Bremen, Germany
Phone: +49-421 24 100 24 (9:00-17:00 hrs)
Fax: +49-421 16827 99
e-mail: info@metbase.de

Update service

MetBase is being regularly updated with basic information and references on new meteorites, analysis data and collection information.
All registered users of *MetBase* are entitled to receive an annual data update.

Chapter 2: Getting started

System Requirements

MetBase for Windows requires the following hardware and software configuration:

Hardware

- An IBM or compatible computer (PC) with **Pentium II** or **better** processor
- At least 32 megabytes of memory (DRAM). For best performance: **128 MB is recommended**
- A hard disk with at least **500 megabytes** of free space (250 megabytes for installed *MetBase* files and about 250 megabytes for temporary files generated during the sessions)
- A VGA color monitor
- A fast graphic card with >4 MB memory is recommended
- **CD-ROM** drive to install *MetBase*
- Printer. A standard laser or bubble-jet printer is recommended.

An *Apple MacIntosh* computer may be used if a program is installed that emulates the Microsoft Windows platform.

Software

- *Microsoft-WINDOWS* version NT, *95*, 98, 2000, ME, XP

System Configuration

Display / Monitor

The display resolution of the Windows graphic should be set to **1024x768 pixel resolution**. The low resolutions will not properly display some *MetBase* windows entirely on the screen.

The color should be set to **high (16 bit)** or **true (24-32 bit) color display mode**. The low 256 colors or less modes will lead to bad or no display of some graphic objects in *MetBase*.

To change the display resolution and color, run the *Windows* **Control Panel, Display** applet

Temporary Work Files

During execution, *MetBase* creates temporary work files that are situated in the *MetBase* home directory. These files have names that contain an arbitrary string of digits or characters and a .TMP extension. Temporary files may be left on your hard drive if you reset the system, or in case of power failure during a *MetBase* session. You should remove those files from disk as they may be taking up a large amount of disk space.

Installing *MetBase*

The installation program **setup.exe** is located in the directory **MBWIN\DISK1** of the CD-ROM

The installation program will search the system for previously installed versions of *MetBase* and will update them if necessary.

Follow the installation procedure:

1. Turn on your computer
2: Start ***Microsoft Windows***
3. Insert the CD-ROM into the dedicated drive
4. Select ***Run*** from the Windows ***Start*** Menu
5. Browse or directly enter the source drive of the floppy disk or CD-ROM and run **setup.exe** (for example: **D:\MBWIN\DISK1\SETUP.EXE**)
6. Follow the on-screen instructions. You will be prompted for a destination directory (**c:\metbase** is default) and program manager group (***MetBase*** is default)
7. After successful installation, you can run *MetBase* by double-clicking on the *MetBase* Icon displayed within the program group window.

Starting Up and Exiting

The **Main Menu Page** is displayed when you start *MetBase*. The first time you run *MetBase* after the installation, *MetBase* will generate a number of index files that are necessary for ordering of data and quick database access. In case of installation of MetBase from floppy disks, the DOS window is opened temporarily for decompressing the data files.

During *MetBase* sessions, you can start other programs, like *Microsoft Word* or *Microsoft Excel* and jump between them (multitasking)

For exiting *MetBase* press the **<Close>** button while you are in the Main Menu Page.

Window and Dialog Controls

The **user interface** consists of windows containing various types of **control objects** that make it easy for you to communicate with *MetBase*. The interface is *non-procedural* (you can perform operations without typing commands) and *event-driven* - *MetBase* waits for you to tell it what to do next. You control the sequence of actions that your PC performs.

MetBase is designed for the use with a **mouse** or a **standard keyboard**. With the keyboard, you use the arrow keys and some keystroke combinations to choose an object or control in the window. With the mouse, you can control windows and contained objects by pointing, clicking and dragging technique.

In *MetBase*, you can find three different types of windows, the **dialog window**, the **browse window** and the **report preview window**.

Dialog windows contain a variety of controls that you use to designate, confirm or cancel actions. Some dialog windows, like the *Detailed Meteorite Information* Dialog, display lots of database information, others, like the *Data Export Window*, do not display any at all. For selecting controls in the dialog window, see later in this Chapter. To close this type of window, choose the **<Close>** or **<Cancel>** button

Browse windows display data in a tabular form. You will find them in the Record Selection Dialog (see Chapter 8, under “Action Bar”). Many data tables are larger than the window. You can **scroll** the table rows and columns in horizontal and vertical direction by using the arrow keys, the **<PgDn>**, **<PgUp>** or **<Tab>** key from the keyboard, or by clicking with the mouse inside the **scroll bar** area. To close the browse window,

press the **<Esc>** key on your keyboard or click with the mouse on the window's close box (the crossed square in the top-right corner of the window). If you wish to re-size a column of the table, click with the mouse at the right column border and drag it to the right side of the screen. This helps you to view text that is hidden because of a too small column size. To display the text with the keyboard, scroll and tab to the specific field and use the right arrow key to scroll the text in the table field to the left.

The **Report Print Preview Window** is displayed when you direct a print form from inside the **Print Report Dialog Window** to the screen. Use the action bar (|<,<,>,>|,) to display first, next, previous, or last page of the print form. You can zoom into the page by clicking with the mouse on the text page or by changing the scale percentage in the zoom box. Click on the door icon to exit the print preview.

Selecting dialog controls with the mouse:

Position the pointer at a specific object then press and release the left mouse button once

In some cases you have to double-click to choose an object - Point to the object then press and release the left mouse button twice in rapid succession.

To select a character string from a table, point to the beginning of the text, hold the left mouse button down and roll the mouse until the pointer is in the desired location, then release the left mouse button. The selected text is displayed in blue colour. To copy text to the buffer, press **<Ctrl>+<c>** key simultaneously. To paste the copied text later, e.g. into a *MS Word* document, press **<Ctrl>+<v>** key.

Selecting dialog controls with the keyboard:

Use the **<Tab>** or one of the four **Arrow keys** on your keyboard to move around on the screen. Press **<Tab>** to go forward to the next menu option, press **<Shift>+<Tab>** keys simultaneously to go backward in the menu. Press the **<Enter>** or **<Spacebar>** key to choose the option. The menu option presently selected is displayed in **blue colour** when using the keyboard

To select a character string from a text box or table: first select the text box or table column with the **<Tab>** key, then use one of the four Arrow keys to move inside the text, e.g., press **<→>** key to move to the right. To copy text to the buffer, first press **<Shift>+** one of the four **arrow keys** to highlight the selected field, then press **<Ctrl>+<c>** keys to copy the selection to the buffer. To paste text from the buffer, press **<Ctrl>+<v>** keys.

Using the hot keys

Most of the **push buttons** in *MetBase* contain short cuts or so called **hot keys**. The hot key is a single letter or number that is **underlined**. Instead of using the **<Tab>** key and then the **<Spacebar>** or **<Enter>** key to choose the option, press the **<Alt>** and the appropriate hot key letter simultaneously. You can use the hot key from any position inside the currently active window.

Types of dialog controls used in *MetBase*

Push Button

The action associated with the push button occurs immediately when you choose it. To choose a push button, left click with the mouse on it or Tab to it and press **<Spacebar>** or **<Enter>** key. Often, a new window appears when you press a push button.

Check Box

Settings can be turned on and off by choosing the check box with the **<Spacebar>**, with **<Enter>** key or by left clicking with the mouse on it. If a check box has an ✓ symbol in it, the setting is on. More than one box in a group can be checked at a time.

Radio Button

Unlike check boxes, only one radio button can be chosen at the same time. Select the radio button and press the **<Spacebar>**, the **<Enter>** key, or click with the mouse on it. When a radio button is chosen, a bullet appears and any previously chosen radio button in the group becomes deselected.

Text / Data Box

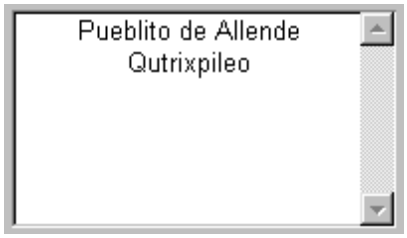
A **text/data box** is a field that displays pieces of information from the database (e.g., meteorite name, country, terrestrial age...). These kinds of fields are set read-only and cannot be edited.

In some dialogs, so called **edit text boxes** are used, where you are asked by the program to enter text. This can be a number or a string of characters (e.g., the name of a meteorite that *MetBase* shall locate in the database). To enter text in the box, press the **<Tab>** key until the edit text box is selected (yellow highlighted) or click on the edit text box with the mouse to position the cursor. Type in the text and press **<Enter>** to execute the program according to your specification. To exit an edit text box, press the **<Tab>** key.

Popup Control

Tab or **Shift+Tab** to the popup control or click with the left mouse button on the popup. The selected item is highlighted in blue color. To display the contained popup items, hold the left mouse button pressed and drag up or downwards in the popup listing. You can also click on the right scroll bar to display further items not fitting on the popup field. Release the left mouse button to select the highlighted item. You can instead use the **<Up>** or **<Down> Arrow** keys in conjunction with the **<Alt>** key to open the popup list. To select an item, press **<Enter>**. You can further use **<PgDn>** and **<PgUp>** to scroll the list one full window at a time. **<Home>** and **<End>** move you to the first or last option in the popup listing.

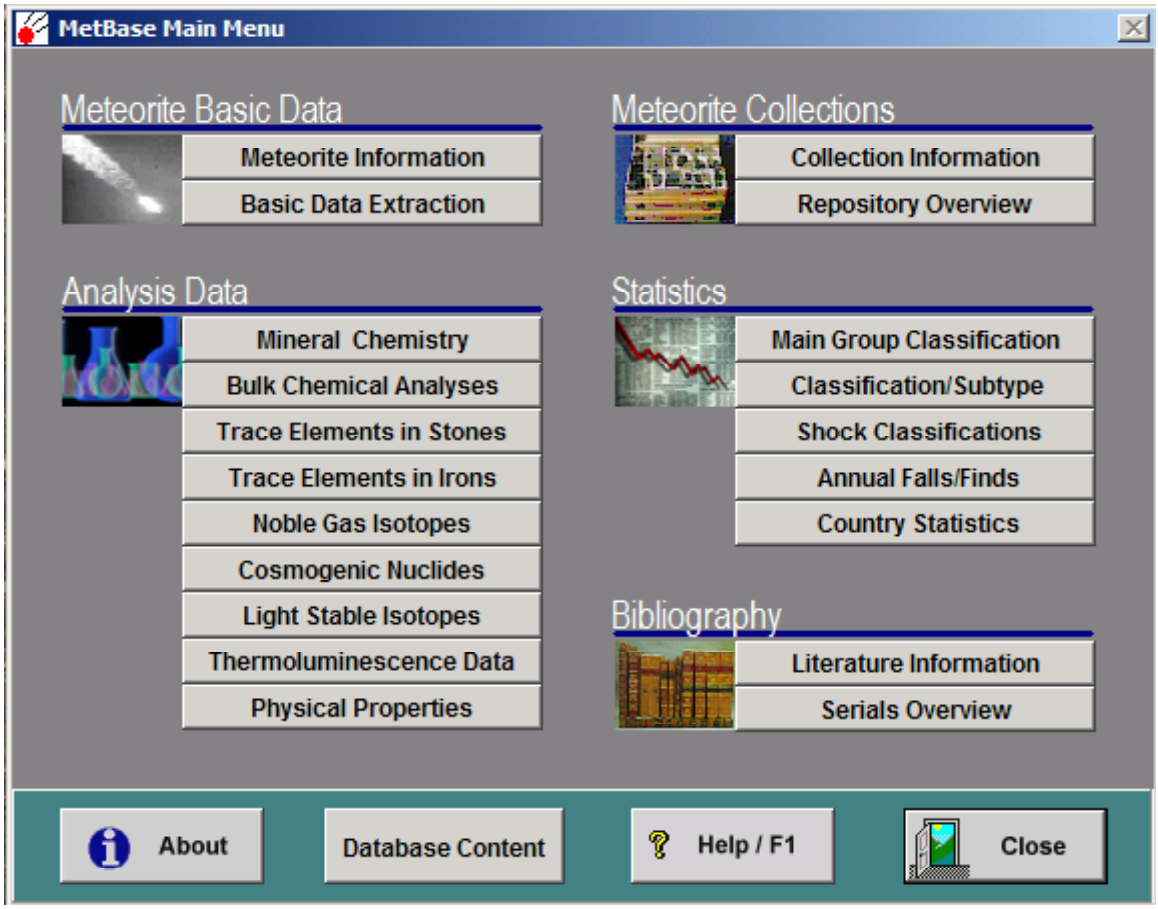
List Objects



List objects in dialog windows usually contain text information of variable length. If there is more text than the list box can display, the arrows of the right scroll bar are enabled (black). For scrolling with the keyboard, **Tab** (forward) or **Shift+Tab** (backward) to the list, then use the **<Up>** or **<Down>** Arrow keys to scroll through it. For scrolling with the mouse, click on the up or down arrow on the scroll bar. If you hold the mouse button down, scrolling will continue until you release the mouse button. To scroll rapidly, point to the thumb and drag it up or down.

MetBase Main Menu Page

When you start *MetBase*, the **Main Menu Page** will be displayed after some seconds. It contains five sectors with menu selection buttons and an action bar at the bottom of the screen. Use the mouse or Tab to the menu option you want to select. Press **<Enter>** or **<Spacebar>** to choose the option. Choose the **<Close>** button to end your *MetBase* session



About *MetBase*

Choose the **<About MetBase>** button to display **copyright and licence information** as well as your **serial number.**

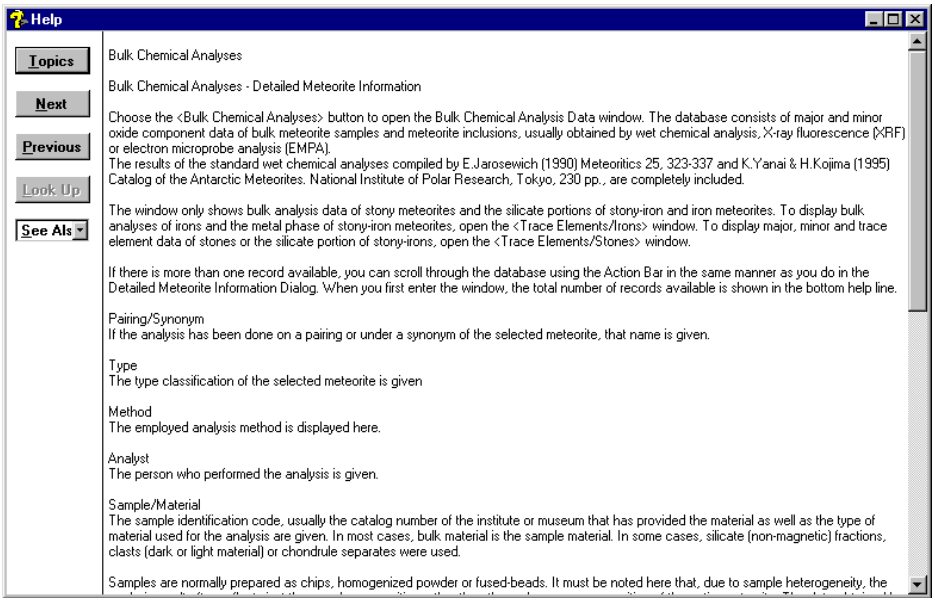
Database Content

Press the **<Database Content>** button to display a table with the current number of data stored in the various database fields.

Using On-Line Help

In the bottom line, a **help text** is displayed that explains the function of the presently selected dialog object control.

The *MetBase* **on-line help** gives you instant access to information as you work. Depending on what is currently displayed, pressing the **<F1> key or <?> button** displays the help index or information about the current menu option, dialog or window. For example, if you press the F1 key while a certain dialog window is active, help for this dialog is displayed.


Help
Topics
Next
Previous
Look Up
See Als
Bulk Chemical Analyses
Bulk Chemical Analyses - Detailed Meteorite Information
Choose the <Bulk Chemical Analyses> button to open the Bulk Chemical Analysis Data window. The database consists of major and minor oxide component data of bulk meteorite samples and meteorite inclusions, usually obtained by wet chemical analysis, X-ray fluorescence (XRF) or electron microprobe analysis (EMPA).
The results of the standard wet chemical analyses compiled by E.Jarosewich (1990) Meteoritics 25, 323-337 and K.Yanai & H.Kojima (1995) Catalog of the Antarctic Meteorites. National Institute of Polar Research, Tokyo, 230 pp., are completely included.
The window only shows bulk analysis data of stony meteorites and the silicate portions of stony-iron and iron meteorites. To display bulk analyses of irons and the metal phase of stony-iron meteorites, open the <Trace Elements/Irons> window. To display major, minor and trace element data of stones or the silicate portion of stony-irons, open the <Trace Elements/Stones> window.
If there is more than one record available, you can scroll through the database using the Action Bar in the same manner as you do in the Detailed Meteorite Information Dialog. When you first enter the window, the total number of records available is shown in the bottom help line.
Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is given.
Type
The type classification of the selected meteorite is given
Method
The employed analysis method is displayed here.
Analyst
The person who performed the analysis is given.
Sample/Material
The sample identification code, usually the catalog number of the institute or museum that has provided the material as well as the type of material used for the analysis are given. In most cases, bulk material is the sample material. In some cases, silicate (non-magnetic) fractions, clasts (dark or light material) or chondrule separates were used.
Samples are normally prepared as chips, homogenized powder or fused-beads. It must be noted here that, due to sample heterogeneity, the

The Help Window consists of two panels: one lists help topics and the other displays details about each topic.

To select a topic in the Help window:

Scroll through the topics to find the one you want, or
Type a letter or series of letters to select the first topic beginning with those letter(s).

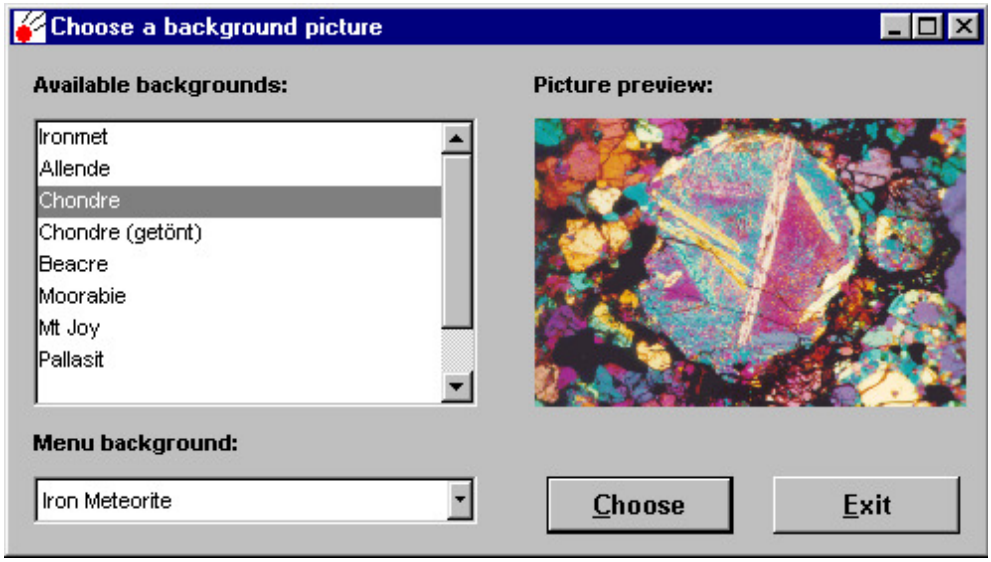
To see details about a topic:

Select the topic and choose the Help push button, or
Select the topic and press Enter, or
Double-click on the topic with the mouse or the Spacebar.

To return to help topics list, choose the Topics push button.
To see information about the next topic, choose the Next push button.
To see information about the previous topic, choose the Previous push button.

Background Picture Selection

Double click with the mouse on the background picture within the **Main Menu Window** to display the Background Picture Selection Dialog Box.

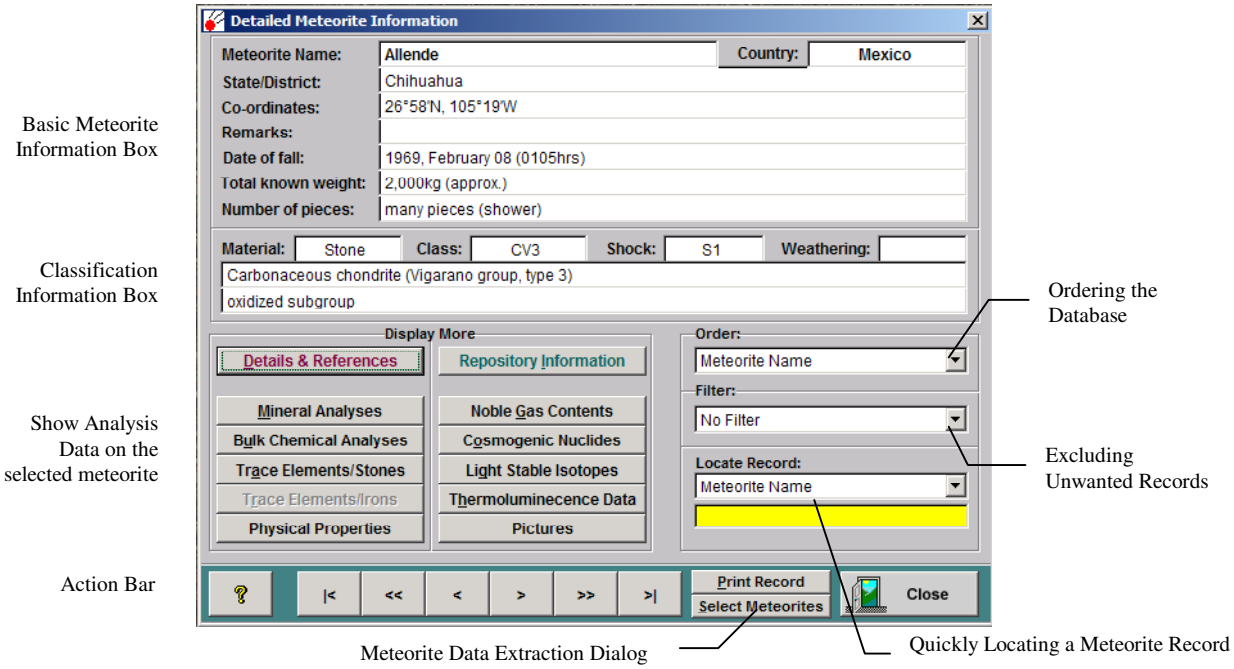


Choose a **background picture** from the **Available backgrounds** list. The selected picture is displayed in the **Picture preview** on the right side. The **Main menu background** can be selected from the **Menu background** popup. Choose “gray“ if you wish to have a plain background. Save the changes to the configuration by pressing the **<Choose>** button. Press the **<Close>** button to return to the main menu

Chapter 3: Meteorite Basic Data

Detailed Meteorite Information

Choose the **<Meteorite Information>** button from the **Main Menu Page** to display the **Detailed Meteorite Information Dialog**. This utility provides all available information about an individual meteorite, like find/fall location, classification, repositories of type samples and thin sections, as well as various analysis data. Information on find circumstance and references to literature in which the selected meteorite is described or chemically analyzed, can also be viewed.



The record of a specific meteorite can be quickly located and displayed. An Action Bar is provided to scroll through the database. The database can be ordered by specific fields and unwanted records can be suppressed from being displayed by using the filter utility.

Basic Meteorite Information Box

Meteorite Name

The name of a meteorite is given as published in *A.L.Graham et al. (1985). Catalogue of Meteorites, British Museum (Natural History), London* or as defined by the Nomenclature Committee of the Meteoritical Society and published in the *Meteoritical Bulletin* or the *Antarctic Meteorite Newsletter.* Synonyms are not displayed in this box.

Names of **Antarctic meteorites** are given in their abbreviated form (e.g., ALHA77001, Y 790001, EET 87521) as determined by the Nomenclature Committee of the Meteoritical Society and the Meteorite Working Group of NASA/JSC. The ANSMET finds from 1976 to 1981 all have an „A“ as the fourth character in the name.

Country

The present name of the country in which the meteorite was recovered is given.

State/District

The name of the state or the region in which the meteorite was recovered is given. If known, the local district or county is appended to the state information (e.g., New Mexico, Roosevelt Co.).

Coordinates

The longitude and latitude of the actual site of recovery are given when it is available. In many cases, the coordinates are those of the name-place, which often is a small village not to be found on a map. In this case, the coordinates of the nearest place shown in the Times Atlas are given. If not otherwise cited, the coordinates are given as published in *A.L.Graham et al. (1985). Catalogue of Meteorites, British Museum (Natural History), London*, the *Meteoritical Bulletin* or the literature that give the first report of the meteorite (e.g. *Antarctic Meteorite Newsletter*).

Remarks

If the authenticity of a meteorite is **doubtful**, which is often the case when all the material of a fall has been lost and when the literature that originally reported the meteorite is inadequate, that is mentioned here. If a previously supposed meteorite turns out to be a product of terrestrial origin it is mentioned as a **pseudometeorite**. In case of an **Antarctic meteorite**, the expedition team that discovered it, is given in this line.

Date of find or fall

The date and time of fall are given for observed falls. If not otherwise stated, these times are the local times of the place of fall. In some cases, the time of fall is reported in different standard times:

Universal Time (Greenwich Mean Time):	UT
Central Standard Time (U.S.A.)	CST
East Standard Time (U.S.A.)	EST
Pacific Standard Time (U.S.A.)	PST
Moscow Standard Time (Russia)	MT

If the date of recovery is not known, the year in which the meteorite was first reported is given with the remark **"before"**. In some instances, a meteorite is known to the local people long before it was recognized as a meteorite and reported in literature, the remark **"known before"** is added. If only the year of recognition as a meteorite is known, the remark **"recognized"** is added

Total known weight

If the total recovered weight of the meteorite is reported in literature, it is mentioned here. If further specimens of a meteorite have been subsequently found, those weights are added to the reported total weight. If no total known weight is reported, the weight sum of all specimens preserved in repositories is given.

Number of pieces

The number of recovered individuals or fragments of a single meteorite is given. In many cases, the number of individuals is supposed to be large but unknown, the remark **"shower"** is given. If there are two or more fragments that fit together to form a single individual, they are counted as one.

Classification Information Box

Material

The rough grouping is given here:

Stone (ST):	Silicates are the dominant components (rock, stony meteorite)
Iron (IR):	Iron-nickel metal is the dominant component (iron meteorite)
Stony-Iron (SI):	Mesosiderites and Pallasites (silicate and metal in more or less equal fractions)

This kind of information is important only in those cases, where a classification has not yet been done.

Class

The type classification is given in this box. The petrographic subtype is included if known. The adopted classification symbols are those commonly used by the literature on the subject like *A.L.Graham et al. (1985). Catalogue of Meteorites, British Museum (Natural History), London* or the journal *Meteoritics*. A description of the used type classification symbols can also be accessed from the Online-Help utility within *MetBase*.

Chemical Main Groups

Ordinary chondrites:	H, L, LL, H/L, L/LL
Enstatite chondrites:	E, EH, EL
Carbonaceous chondrites:	C, CI, CH, CK, CM, CO, CR, CV
Rumuruti type chondrites	R (known also as Carlisle Lake type)
Ungrouped chondrites:	CHUNGR
Achondrites	AUB, AEUC, ADIO, AHOW, ANGR
Primitive achondrites:	ALOD, ACAP, ABRA, AURE, AWIN
SNC group achondrites:	ACHA, ANAK, ASHE, AOPX
Lunar meteorites:	ALUN-A, ALUN-B, ALUN-G
Pallasites	PAL
Mesosiderites:	MES, MES-A, MES-B
Iron meteorites:	IAB, IC, IIAB, IIC, IID, IIE, IIF, IIIAB, IIICD, IIIE, IIIF, IVA, IVB

Petrographic Types

For chondrites, the petrographic type number is added to the chemical group symbol:

1 to 2:	unequilibrated chondrites (carbonaceous chondrites only)
3.0 to 3.9:	unequilibrated chondrites
4 to 6	equilibrated chondrites
7	equilibrated chondrites with achondritic texture

Intermediate petrographic types are usually indicated by a slash: for example, **5/6** indicates a type intermediate between 5 and 6. On the other hand, **4-6** indicates that the chondrite is a **breccia** containing clasts or matrix of petrographic type 4 and 6. For unequilibrated chondrites, the **subtypes** are given if known (e.g., LL3.5, CO3.2)

Ungrouped and Anomalous Meteorites

Meteorites that do not fit into any known classificational group are designated ***ungrouped*** (UNGR). This is the case for numerous irons (symbol: IRUNGR). If a meteorite possesses most of the properties considered typical for a classificational group, but differs in some important respects and is therefore designated an ***anomalous member*** of that group, the abbreviation ***AN*** is appended to the classification symbol (e.g., IIIE-AN)

Achondrite Subgroups

Polymict, monomict or cumulate achondrites: a ***P*** is appended to the classification symbol if the achondrite is polymict (e.g., AEUC-P for a polymict eucrite, ADIO-P for polymict diogenite or AURE-P for polymict ureilite). If a eucrite is known to be monomict, this is indicated by an ***M*** (e.g., AEUC-M). If the eucrite is of cumulate type, this is indicated by a ***C*** (e.g., AEUC-C)

Mesosiderites Subgroups

Further subgroups ***A1*** to ***B4*** have been designated for mesosiderites. If the subgroup was determined, it has been appended to the type classification symbol (e.g., "MES-A1")

The database field that contains these classification symbols can be accessed under the name *Classification/Subtype* in the Record Selection Dialog.

You can display all classificational groups used within *MetBase*, for details see under Chapter 8, “Action Bar, <Symbols> button“.

Shock

The shock classification is given in this box. There are two different classification schemes used in the literature. The now commonly used classification system (symbols ***S1*** to ***S6*** for six **shock stages**) was proposed by D.Stöffler et al. (1991) *Geochim. Cosmochim. Acta* **55**, 3845-3867. Classifications after the older scheme, introduced by R.T.Dodd and E.Jarosewich (1979) *Earth Planet. Sci. Lett.* **44**, 335-340, using **shock facies** (***a*** to ***f***) are provided if no subsequent revisions were made according to the new system. For details on the used symbols, see Chapter 8, “Action Bar - <Symbols> button“. Further details on the used shock classification systems can also be accessed from the Online-Help utility within *MetBase* (under *Shock Classification*)

Weathering

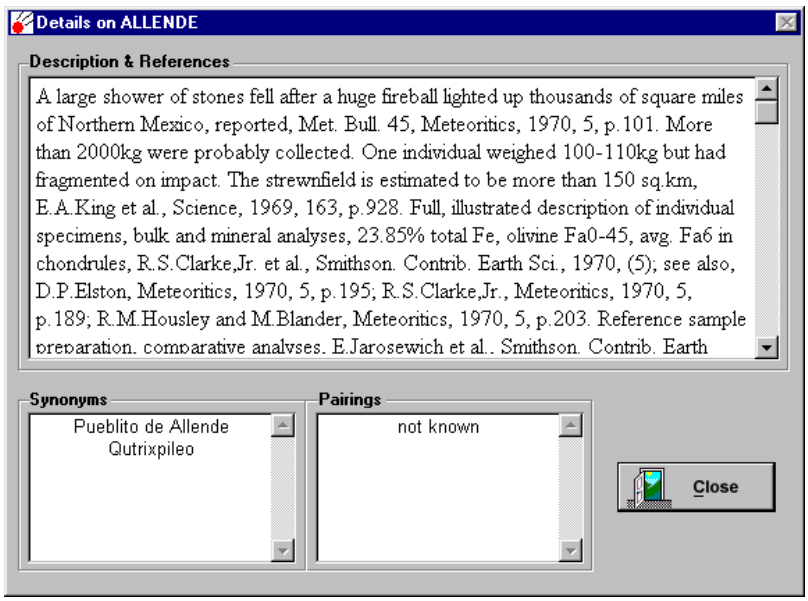
The weathering category is given here. A classification scheme with the scales ***A***, ***B*** and ***C*** (***e*** indicating the presence of evaporites) is in use by the Meteorite Working Group at the NASA Johnson Space Center and is mainly applied to Antarctic meteorite finds (hand specimens). A new system, introduced by F.Wlotzka (1993) *Meteoritics* **28**, 460, is using six scales, ***W1*** to ***W6***. Here, the weathering scales are determined on polished sections. For details on the used symbols, see Chapter 8, “Action Bar - <Symbols> button“. Further details on the weathering classification schemes can also be accessed from the Online-Help utility within *MetBase* (under *Weathering Categories*)

Classification Remarks

The two lines box gives the classification text and additional information, like *structural types* and *kamacite bandwidths* of and presence of *silicate inclusions* in **iron meteorites**, or *textural features* of **stony and stony-iron meteorites**, like *brecciation*, *shock veining* , *olivine shape* (in pallasites), or the presence of *clasts*, *maskelynite*, *ringwoodite*... The kind of subgroup *(oxidized* or *reduced*) is given in case of CV chondrites.

Details & References

Choose the **<Details & References>** button from the **Display More Box** to open the **Meteorite Details Window**


Details on ALLENDE
Description & References
A large shower of stones fell after a huge fireball lighted up thousands of square miles of Northern Mexico, reported, Met. Bull. 45, Meteoritics, 1970, 5, p.101. More than 2000kg were probably collected. One individual weighed 100-110kg but had fragmented on impact. The strewnfield is estimated to be more than 150 sq.km, E.A.King et al., Science, 1969, 163, p.928. Full, illustrated description of individual specimens, bulk and mineral analyses, 23.85% total Fe, olivine Fa0-45, avg. Fa6 in chondrules, R.S.Clarke,Jr. et al., Smithson. Contrib. Earth Sci., 1970, (5); see also, D.P.Elston, Meteoritics, 1970, 5, p.195; R.S.Clarke,Jr., Meteoritics, 1970, 5, p.189; R.M.Housley and M.Blander, Meteoritics, 1970, 5, p.203. Reference sample preparation, comparative analyses. E.Jarosewich et al., Smithson. Contrib. Earth
Synonyms
Pueblito de Allende
Qutrixpileo
Pairings
not known
Close

The **Description & References** box displays details like find/fall circumstance or literature references to data used in *MetBase*. The literature cited here covers find reports, detailed descriptions and a variety of analyses on the selected meteorite. Only the first author is given in case of publications with more two authors. The following acronyms are used for commonly cited Journals: **GCA** for *Geochimica et Cosmochimica Acta*, **AMN** for *Antarctic Meteorite Newsletter*, **LPSC** for the *Abstracts of the Lunar and Planetary Science Conference*. Some further acronyms and abbreviations are generally used:

AAS	Atomic Absorption Spectroscopy
abs.	Abstract
Bull.	Bulletin
CAI	Calcium, Aluminium-rich Inclusions
Cat.	Catalogue
CL	Cathodo-Luminescence
Co.	County
Colln.	Collection
Fa, Fs	Fayalite, Ferrosillite
FUN	Fractionation and Unknown Nuclear Effects
Ga	Billion years
INAA	Instrumental Neutron Activation Analysis
Inst.	Institute, Institution
loc. cit.	Publication cited earlier in text
Ma	Million years
Met.	Meteorite, Meteorites, Meteoritical
Mus.	Museum
Nat.	Natural, National
REE	Rare-Earth Elements
SEM, TEM	Scanning Electron Microscope, Transmission Electron Microscope
TL, NTL	Induced Thermoluminicence, Natural Thermoluminescence
Univ.	University
XRF	X-ray fluorescence analysis

Synonyms

The **Synonyms box** lists the known synonymous names of the selected meteorite. Most of the older synonyms are taken from *A.L.Graham et al. (1985). Catalogue of Meteorites, British Museum (Natural History), London.* In many cases, synonyms originate from different ways of spelling or the presence of characters with diacritical marks (e.g. Béréba: synonym = Bereba). Different systems of transliterations of Cyrillic or Chinese names are always a source of synonyms. Often, especially in case of meteorite showers, there is more than one place-name known (e.g. the North Chile shower: Tocopilla, Filomena, Coya Northe,...)

Pairings

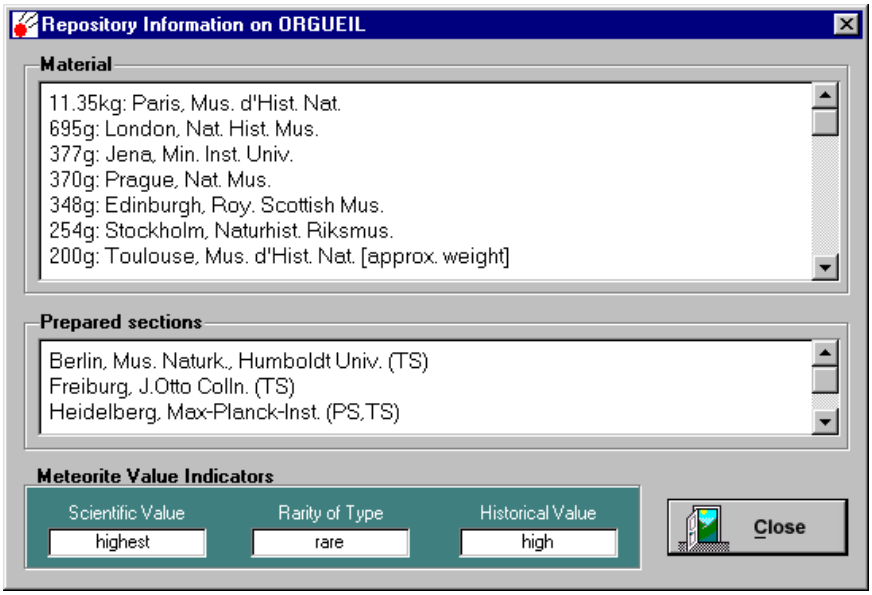
The **pairings box** lists the supposed pairings of the selected meteorite. All those meteorites are designated as pairing that were originally recovered some distance apart and hence given separate names, but later recognized as fragments of a single parent mass, on the basis of classification, chemical composition, texture, TL-data, terrestrial age, or other diagnostic features. A question mark is placed behind the name, if pairing is less probable or questionable. In case that there are more than two pairings of a meteorite, *MetBase* uses a parent pairing name that is displayed in the pairings box of all sister pairings. *MetBase* does not cross-references all pairings with each other. To display the complete list of pairings, select the corresponding parent pairing in the Detailed Meteorite Information Dialog.

A general distinction between pairings and synonyms in *MetBase* is, that a pairing can always be selected as an independent record under its pairing name, whereas a synonym cannot.

Press the **<Close>** button to return to the previous window.

Repository Information

Choose the **<Repository Information>** button to display the **Repository Information Window**.



Material Box

A list of repositories that keep material of the selected meteorite is displayed. Just the weight sum of all individual specimens in a repository is given. The remark “main mass” is added if the repository holds more than 50% of the total known weight of the meteorite. To display detailed information about the listed repository names, select the **<Collection Information>** button from the **Main Menu Page**, see Chapter 4, “Collection Information”. If there are larger masses in a collection that have been recovered from the same area, but have not yet been analyzed (thus may belong to different falls), they are listed separately using lower case letters in brackets following the name (like *Tokyo (a)* and *Tokyo (b)*).

Processed material in a collection, like powder, turnings, or sawdust, is not included in the weight calculation, unless a special remark is given. Oxidized material, like iron shale or rust, is usually not considered in the database, except for those cases, where most of the meteorite is known to be oxidized. Also not considered in the database are weights of less than 1 gram of a meteorite in a collection, except for those meteorites, that are not very well distributed or that have total known weights of about 1 kg or less.

It must be noted here, that the information used in *MetBase* cannot always be up-to-date. There are younger and older collection inventory lists that have been used as reference. Meteorite exchanges between collections may have taken place after inventory lists had been prepared. It may therefore happen that the weight sum of material in all listed collections slightly exceeds the total known weight of the specific meteorite. Although we made all effort to get the available information on every known repository, there is no reason to believe that the records in *MetBase* are complete.

Prepared Sections Box

Prepared Sections of the meteorite are listed separately from the material information. The type of section is mentioned in brackets:

PS	Polished section or mount (mainly in case of iron meteorites)
TS	Thin section (covered thin section)
PTS	Polished thin section (uncovered)

Meteorite Value Indicators

Three different parameter were chosen to give an approximate indication of the meteorite value:

1. Scientific value
Of high scientific value are those meteorites that are highly demanded by researchers and subject for numerous scientific publications (like *Allende*, *Murchison*, or *Semarkona*). Types like achondrites, unequilibrated chondrites, carbonaceous and enstatite chondrites are commonly of higher scientific interest than main group iron meteorites and ordinary chondrites. Further are *fresh falls* of higher value than *weathered finds*, and all those meteorites that show distinctive features like *shock melting*, *brecciation*, presence of *clasts,* and *unusual chemical* or *isotopical composition.*

Scale: *low - medium to low - medium - high - highest*

2. Rarity of Type
Provided as a combination of the availability and distribution of specimens of a specific meteorite and the rarity of the whole group of which the meteorite is part of. The rarity of a group is indicated by the total number of group members (excluding pairings) and the total known weight of the group material. For a statistical survey of meteorite types, see Chapter 6: Statistics - Classification/Subtype.

Scale: *very common - common - not so common - rare - very rare*

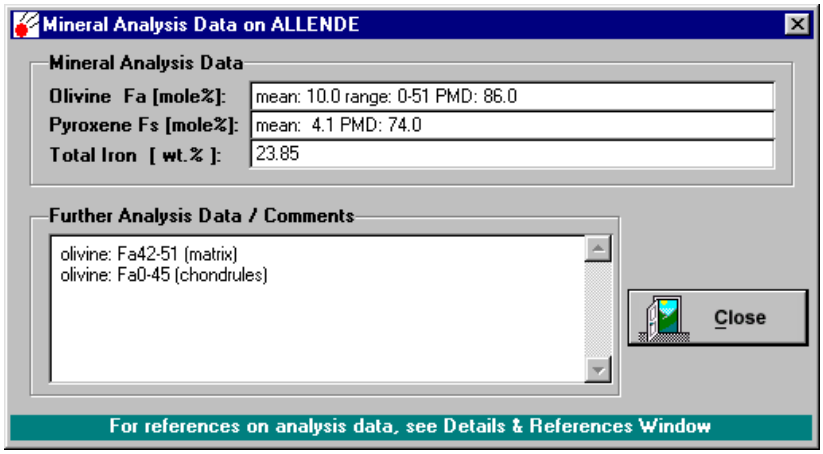
3. Historical value
Some meteorites are not so much of scientific value, but are connected to special events, tales and stories. An ancient fall like *Ensisheim* is of much higher historical interest than a more recent desert find. Meteorite falls of the *18th* and *early 19th century* are in general of high historical interest. Some other examples are those meteorites that struck a car or house (like *Benld* and *Peekskill*) and meteorite falls of which the orbit could be calculated (like *Pribram* or *Innisfree*).

Scale: *low - medium - high - highest*

Mineral Analyses

The **Mineral Analysis Data** window is displayed if there are analysis data on silicates of the selected meteorite available. The window shows classification relevant data, like olivine fayalite and pyroxene ferrosillite contents. References to the data can be found under **Details & References**. For extracting of data, see Chapter 5: Analysis Data.

This push button is disabled if there are no analysis data available for the selected meteorite.


Mineral Analysis Data on ALLENDE
Mineral Analysis Data
Olivine Fa [mole%]:
mean: 10.0 range: 0-51 PMD: 86.0
Pyroxene Fs [mole%]:
mean: 4.1 PMD: 74.0
Total Iron [wt.%]:
23.85
Further Analysis Data / Comments
olivine: Fa42-51 (matrix)
olivine: Fa0-45 (chondrules)
Close
For references on analysis data, see Details & References Window

Olivine Fa, Pyroxene Fs
Displayed are mean value, standard deviation (1 sigma value), range (min - max value), and PMD (percentage mean deviation) value in mole-% when available.

Total Iron
The total iron content of the bulk material is shown in weight-%.

Other Analysis Data / Comments
This box shows further analysis data, like plagioclase, pyroxene or kamacite composition

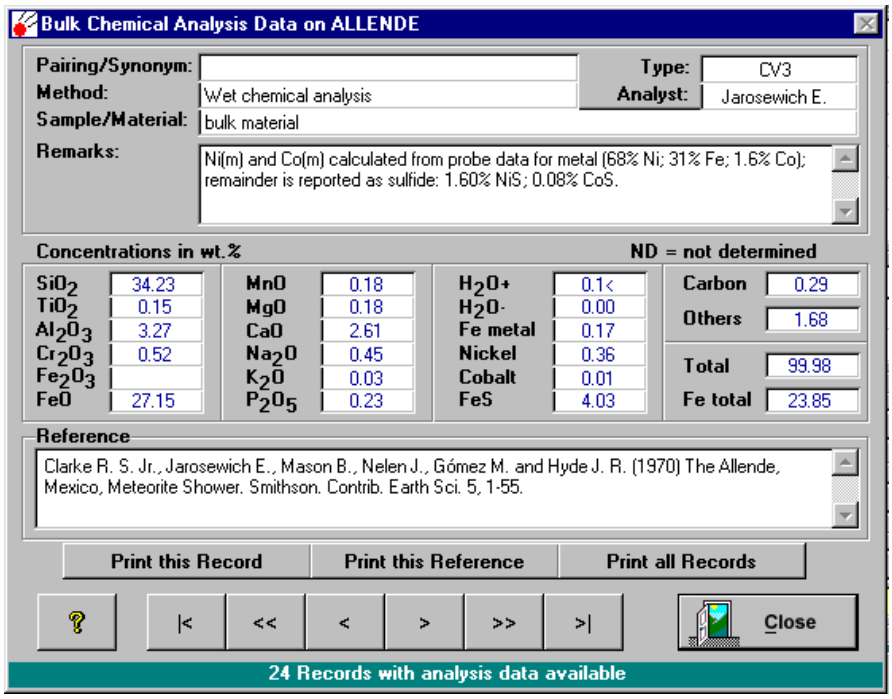
Choose the **<Close>** button to return to the previous window.

Bulk Chemical Analyses

Choose the **<Bulk Chemical Analyses>** button to open the **Bulk Chemical Analysis Data** window. The database mainly contains results of **standard wet chemical analyses**. Data from the large compilations published by E.Jarosewich (1990) *Meteoritics* **25**, 323-337 and K.Yanai & H.Kojima (1995*) Catalog of the Antarctic Meteorites*. National Institute of Polar Research, Tokyo, 230 pp, are completely included.

The window only shows analysis data of stony meteorites and silicate portions of stony-iron and iron meteorites. To display bulk analyses of irons and the metal phase of stony-iron meteorites, open the **Trace Element Analyses** Window, as described later in this Chapter. For extracting of data, see Chapter 5: Analysis Data.

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is given.

Type
The type classification of the meteorite is given

Method
The employed method of analysis is displayed here.

Sample/Material
The sample identification code, usually the catalog number of the institute or museum that has provided the material as well as the type of material used for the analysis is given. In most cases, bulk material is the sample material. In some cases, silicate (non-magnetic) fractions, clasts (dark or light material) or chondrule separates were used.

Samples are normally prepared as chips, homogenized powder or fused-beads. It must be noted here that, due to sample heterogeneity, the analysis result often reflects just the sample composition rather than the real average composition of the entire meteorite. The data obtained by E.Jarosewich are more accurate with respect to average meteorite composition, because larger quantities of the specific meteorites have mostly been used for sample preparation (homogenized powder).

Analyst
The person who performed the analysis is given.

Remarks
Remarks to the analysis data and details on results for further components analyzed but not given in the fixed component concentration boxes are given.

Component concentration boxes
The concentration in wt.% of the specific component is given as published in the cited literature. Analyzed components not given in the fixed boxes are grouped together in the "Others" box and are annotated in the Remarks box. The sum of all component concentrations is calculated and displayed in the "Total" box. The total iron content is separately printed in the "Fe total" box. "ND" indicates, that the specific component was not determined. We strongly recommend to read the original literature before using values for statistical calculations, etc.

References
The source of the used information is displayed in this box. The accessed analysis database is ordered by the name of the first author.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

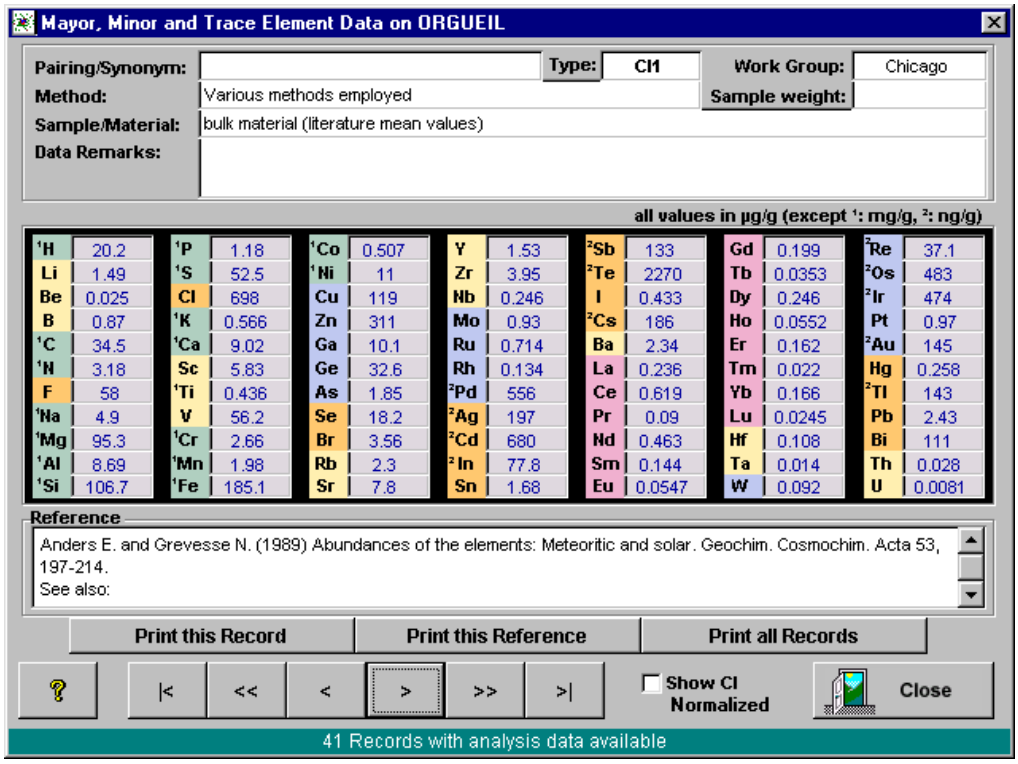
<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

<Print all Records>
Choose this button to print all data of all references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except for the **<Close>** button are disabled.

Trace Elements / Stones

Major, minor and trace element analysis data can be displayed by choosing the **<Trace Elements/Stones>** button of the **Detailed Meteorite Information** Window. This push button is disabled if there are no analysis data available for the selected meteorite. The window mainly contains analysis data on whole rock samples of stony meteorites, but can also contain data on clasts and silicate phases of stone, stony-iron and iron meteorites. Choose the **<Trace Element/Irons>** button if you wish to access trace element analysis data on iron meteorites or the metal phase of stony-iron meteorites. For extracting of data, see Chapter 5: Analysis Data.


Mayor, Minor and Trace Element Data on ORGUEIL
Pairing/Synonym:
Type: CI1
Work Group: Chicago
Method: Various methods employed
Sample weight:
Sample/Material: bulk material (literature mean values)
Data Remarks:
all values in µg/g (except ¹: mg/g, ²: ng/g)
¹H 20.2 | ¹P 1.18 | ¹Co 0.507 | Y 1.53 | ²Sb 133 | Gd 0.199 | ²Re 37.1
Li 1.49 | ¹S 52.5 | ¹Ni 11 | Zr 3.95 | ²Te 2270 | Tb 0.0353 | ²Os 483
Be 0.025 | Cl 698 | Cu 119 | Nb 0.246 | I 0.433 | Dy 0.246 | ²Ir 474
B 0.87 | ¹K 0.566 | Zn 311 | Mo 0.93 | ²Cs 186 | Ho 0.0552 | Pt 0.97
¹C 34.5 | ¹Ca 9.02 | Ga 10.1 | Ru 0.714 | Ba 2.34 | Er 0.162 | ²Au 145
¹N 3.18 | Sc 5.83 | Ge 32.6 | Rh 0.134 | La 0.236 | Tm 0.022 | Hg 0.258
F 58 | ¹Ti 0.436 | As 1.85 | ²Pd 556 | Ce 0.619 | Yb 0.166 | ²Tl 143
¹Na 4.9 | V 56.2 | Se 18.2 | ²Ag 197 | Pr 0.09 | Lu 0.0245 | Pb 2.43
¹Mg 95.3 | ¹Cr 2.66 | Br 3.56 | ²Cd 680 | Nd 0.463 | Hf 0.108 | Bi 111
¹Al 8.69 | ¹Mn 1.98 | Rb 2.3 | ²In 77.8 | Sm 0.144 | Ta 0.014 | Th 0.028
¹Si 106.7 | ¹Fe 185.1 | Sr 7.8 | Sn 1.68 | Eu 0.0547 | W 0.092 | U 0.0081
Reference
Anders E. and Grevesse N. (1989) Abundances of the elements: Meteoritic and solar. Geochim. Cosmochim. Acta 53, 197-214.
See also:
Print this Record
Print this Reference
Print all Records
?
|<
<<
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>
>>
>|
Show CI Normalized
Close
41 Records with analysis data available

If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Work Group
The work group (normally research institution or museum) which performed the specific analysis is given.

Method
The employed method of the analysis and remarks to the measurement are displayed here

Sample/Material
The kind of material analyzed (bulk material, separate, mineral separate, silicate,...) is displayed. The sample identification code, usually the catalog number of the institute or museum that has provided the material is given in this box. Sometimes, mean values were calculated from analysis data on two or more splits of a meteorite sample. In such case, the number of original analyses is given here.

Sample Weight
The mass in mg of the analyzed sample is shown in this box. In those cases, where only weight ranges instead of exact sample weights are given in the literature source, the lower value of the range is stored in the database. If the measured sample is a split of powdered and homogenized material, the mass of the original sample of which the powder was made of, is given. The field is left empty if the sample mas is not mentioned in the cited literature.

Element concentration boxes
The values are displayed as published in the referenced literature. In some cases, trailing decimal zeros are not displayed although may be given in the original publication. As a result, the apparent precision of the given value may be lower compared to that in the original publication. We strongly recommend to read the original literature before using values for statistical calculations, etc. Published values below the detection limit of the employed analysis method (symbolized by "<") are given in the **Data Remarks** box.

The **background colors** of the element field give the following rough indications:

green:	**major or minor elements** (>99 weight % of all elements in the solar abundance table)
blue:	predominantly **siderophile** trace elements (generally "iron-metal loving" noble elements)
yellow:	predominantly **lithophile** trace elements (reactive "oxygen-loving" elements that are enriched in the silicate phase of meteorites)
pink:	**Rare Earth Elements** (REEs), also lithophile elements
orange:	**volatile** and **labile** elements, being generally depleted in thermally metamorphosed meteorites

Show CI Normalized
Check this box if you wish to have the analysis data displayed normalized to the average CI element abundances. The ratios are calculated using the average CI data published by E.Anders and N.Grevesse (1989) *Geochim. Cosmochim. Acta* 53, 197-214. A value lower than 1 means a depletion of the specific element relative to the mean CI abundance (approximately matching the solar abundance). A value of more than 1 means an enrichment relative to CI of the specific element in the analyzed sample

References
The source of the used information is displayed in this box. The accessed analysis database is ordered by the name of the first author.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

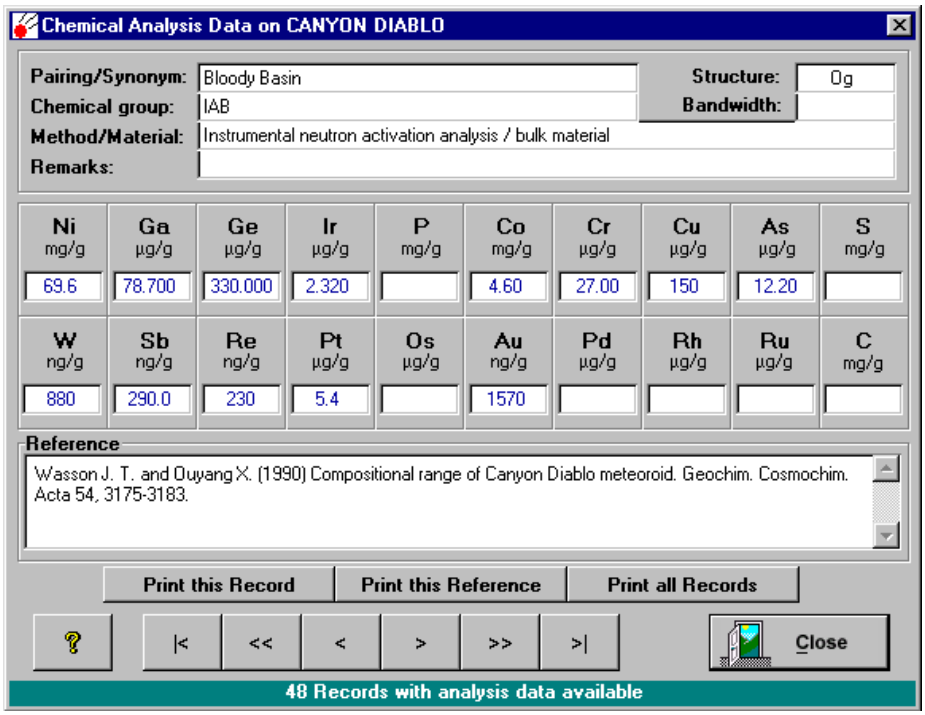
<Print all Records>
Choose this button to print all data of all references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except for the **<Close>** button are disabled.

Trace Elements / Irons

When the selected meteorite is an **iron** or **stony-iron** meteorite, this window is displayed if there are records with analysis data of the metal phase stored in *MetBase*. For these types of meteorites, classification is mainly based on the nickel, gallium, germanium and iridium contents. We have included a number of other elements that are no less important for the chemical grouping of iron and stony-irons. For extracting of data, see Chapter 5: Analysis Data.

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. The total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Chemical group
The classification (in case of iron meteorites also known as the chemical group) of the meteorite is given.

Structure
The structural type symbol, which is mainly based on the bandwidth and structure of the kamacite is given

H = hexahedrite, Ogg = coarsest octahedrite, Og = coarse octahedrite, Om = medium Octahedrite, Of = fine octahedrite, Off = finest octahedrite, Opl = plessitic octahedrite, D = ataxite, SA = structurally anomalous

Bandwidth
The average kamacite bandwidth in millimeters is given

Methods/Material
Method of analysis and analyzed sample material type is given

Remarks
Further analysis and data remarks are displayed here.

Element concentration boxes
The value is displayed as published in the cited literature. Trailing decimal zeros are no indication of absolute precision of the measurement. All values of an element are formatted in a fixed number of decimal places. We strongly recommend to read the original literature before using values for statistical calculations, etc. If uncertainties are mentioned in the publication, they are shown in the **Methods/Remarks** box for the corresponding element value.

References
The source of the used information is displayed in this box. The accessed analysis database is ordered by the name of the first author.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

<Print all Records>
Choose this button to print all data of all references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter. This button is disabled, if only a single record exists

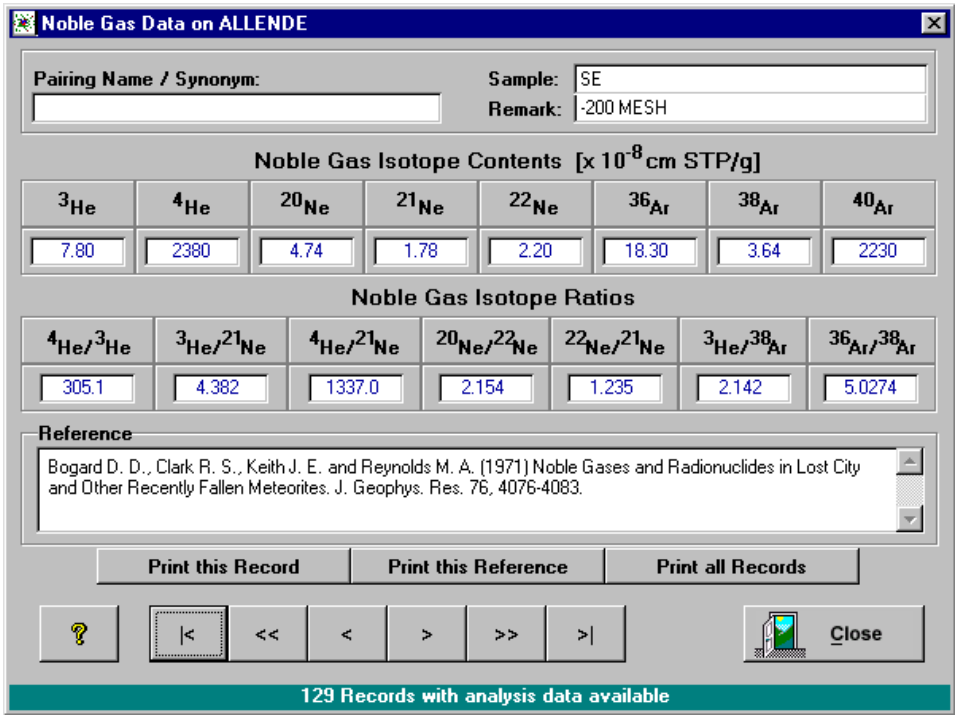
Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except for the **<Close>** button are disabled.

Noble Gas Contents

Choose the **<Noble Gas Contents >** button to open the **Noble Gas Data Window**. For extracting of data, see Chapter 5: Analysis Data.

The noble gas isotopic data compilation up to the year 1996 was kindly provided by Dr. Ludolf Schultz, Max-Planck-Institut für Chemie, Mainz, Germany.

This push button is disabled if there are no analysis data available for the selected meteorite.


Noble Gas Data on ALLENDE
Pairing Name / Synonym:
Sample: SE
Remark: -200 MESH
Noble Gas Isotope Contents [x 10-8 cm STP/g]
3He 4He 20Ne 21Ne 22Ne 36Ar 38Ar 40Ar
7.80 2380 4.74 1.78 2.20 18.30 3.64 2230
Noble Gas Isotope Ratios
4He/3He 3He/21Ne 4He/21Ne 20Ne/22Ne 22Ne/21Ne 3He/38Ar 36Ar/38Ar
305.1 4.382 1337.0 2.154 1.235 2.142 5.0274
Reference
Bogard D. D., Clark R. S., Keith J. E. and Reynolds M. A. (1971) Noble Gases and Radionuclides in Lost City and Other Recently Fallen Meteorites. J. Geophys. Res. 76, 4076-4083.
Print this Record
Print this Reference
Print all Records
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Close
129 Records with analysis data available

If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing Name/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is given.

Sample
The kind of analyzed material (bulk material, mineral separate, magnetic fraction,...) is shown:

Remark
Important notes on the sample used in the analysis and its preparation are mentioned in this box.

Noble Gas Isotopic Concentrations and Ratios
The concentrations are given in 10^{-8} cm^3 STP/g of analyzed sample material. The isotopic ratios are computed directly from the concentration values. They are not corrected and may be less precise than the values given in the original publication. Trailing decimal zeros are no indication of absolute precision of the measurement. All values are formatted in a fixed number of decimal places. We strongly recommend to read the original paper before using values for statistical calculations, etc.

References
The source of the used information is displayed in this box. The accessed analysis database is ordered by the name of the first author.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print all Records>
Choose this button to print all data of all available references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

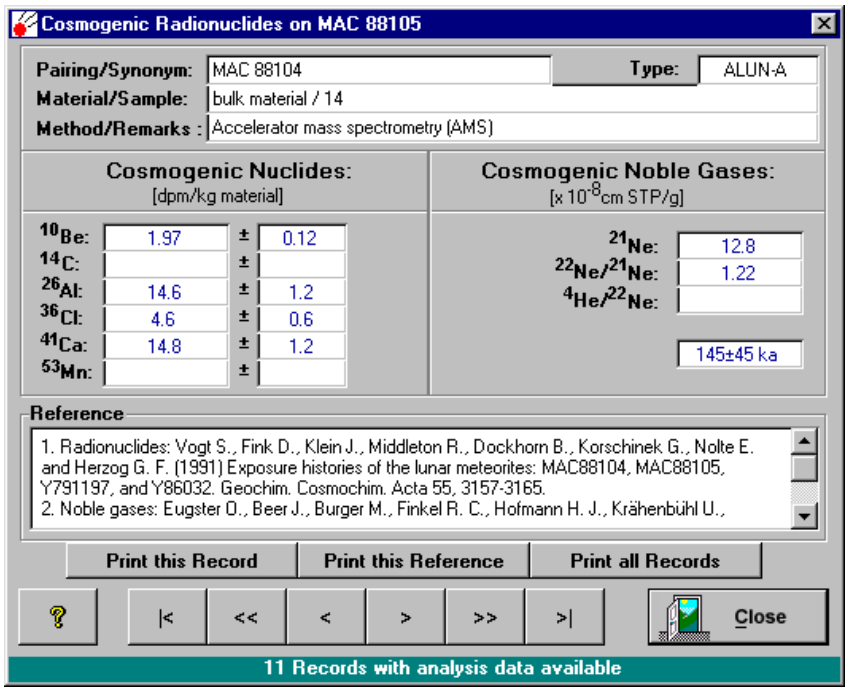
Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

Cosmogenic Nuclides

Choose the **<Cosmogenic Nuclides >** button to open the **Cosmogenic Radionuclide Data** Window. It contains the cosmogenic radionuclides ^{10}Be, ^{14}C, ^{26}Al, ^{36}Cl, ^{41}Ca and ^{53}Mn, the cosmogenic noble gas ^{21}Ne$_c$, as well as terrestrial ages calculated from the ^{14}C or ^{36}Cl data, if available. For extracting of data, see Chapter 5: Analysis Data.

A compilation of cosmogenic radionuclides (^{10}Be, ^{26}Al, ^{36}Cl, ^{53}Mn, ^{21}Ne) containing all data available as of August 1987 was kindly provided by Dr. Kunihiko Nishiizumi, University of California, San Diego, USA. See also: K.Nishiizumi (1987) *Nucl. Tracks Radiat. Meas.* **13**, 209-273.

The push button is disabled if there are no analysis data available for the selected meteorite.


Cosmogenic Radionuclides on MAC 88105
Pairing/Synonym: MAC 88104
Type: ALUN-A
Material/Sample: bulk material / 14
Method/Remarks : Accelerator mass spectrometry (AMS)
Cosmogenic Nuclides: [dpm/kg material]
Cosmogenic Noble Gases: [x 10-8cm STP/g]
10Be: 1.97 ± 0.12
14C:
26Al: 14.6 ± 1.2
36Cl: 4.6 ± 0.6
41Ca: 14.8 ± 1.2
53Mn:
21Ne: 12.8
22Ne/21Ne: 1.22
4He/22Ne:
145±45 ka
Reference
1. Radionuclides: Vogt S., Fink D., Klein J., Middleton R., Dockhorn B., Korschinek G., Nolte E. and Herzog G. F. (1991) Exposure histories of the lunar meteorites: MAC88104, MAC88105, Y791197, and Y86032. Geochim. Cosmochim. Acta 55, 3157-3165.
2. Noble gases: Eugster O., Beer J., Burger M., Finkel R. C., Hofmann H. J., Krähenbühl U.,
Print this Record
Print this Reference
Print all Records
|<
<<
<
>
>>
>|
Close
11 Records with analysis data available

If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Type
The type classification of the specific meteorite is given.

Material/Sample
The **sample identification number**, when available, as well as the kind of material analyzed (bulk material, metal, mineral separate, magnetic fraction, non-magnetic fraction,...) is given in this box.

Method/Remark
The **analysis method** and remarks to given analysis data is displayed, e.g. AMS = Accelerator Mass Spectrometry, GRC = Gamma-ray Counting Techniques...

Cosmogenic Radionuclide Activities
The activitiy of each analyzed radionuclide is given in dpm/kg of analyzed sample type. Right to this box, the experimental error is given and indicates ± 1 standard deviation.

Cosmogenic Light Noble Gas Concentrations and Ratios
The concentration [x 10^{-8} cm^3 STP/g material] of $^{21}Ne_c$ and the ratios of $^{22}Ne/^{21}Ne_c$ or $^{4}He/^{21}Ne_c$ in case of iron meteorites, is given as published in the reference.

Terrestrial Age
The terrestrial age in ka is also given when available. The calculated ages are usually based on the ^{36}Cl or ^{14}C activity data, the nuclide production rates and the shielding conditions in the sampled meteorite.

References
The literature reference to the used information is given in this box. If the source of the cosmogenic noble gases (CNG) is different from that of the radionuclides (CRN), the references are listed separately. The accessed analysis database is ordered by the name of the first author (CRN).

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print all Records>
Choose this button to print all data of all available references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

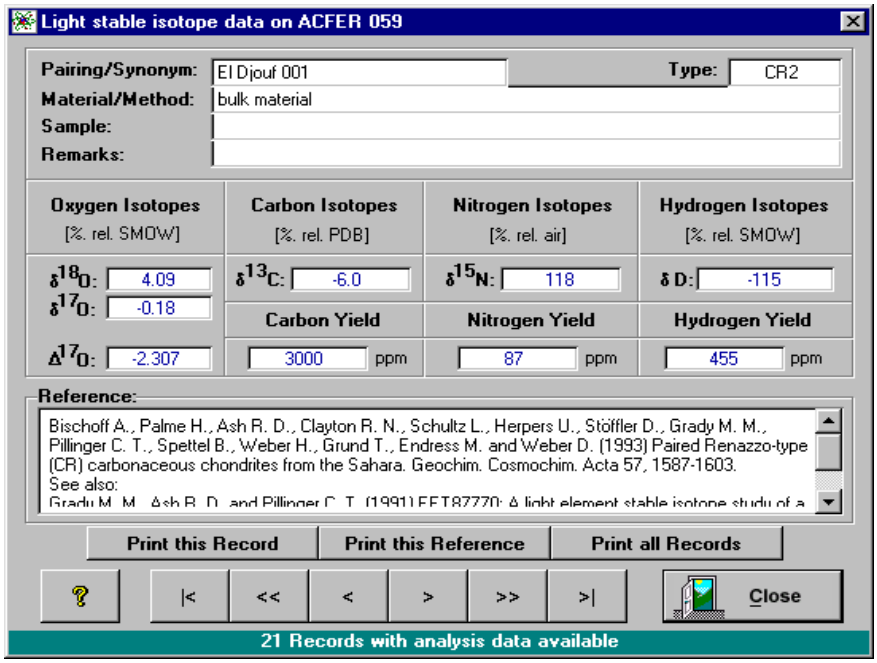
Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

Light Stable Isotopes

Choose the **<Stable Isotopes>** button to open the **Light Stable Isotopes Information Window**. It contains oxygen, carbon, nitrogen, and hydrogen isotopic compositions of bulk samples, compounds (e.g., clasts, chondrules and CAIs) and sparates (mineral grains, density- and grain-size fractions fractions) of stones, stony-irons and iron meteorites.

Most of C, N, and H isotope measurements have been done by the stepped-combustion or stepped-pyrolysis method. In this case, only the total C, N, and H abundances (yields) and their average isotopic compositions as released over the given temperature range are shown in this window.

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Type
The type classification of the specific meteorite is given.

Material/Method
The kind of material analyzed (bulk material, separate, mineral separate, silicate, metal,...) is displayed along with information about the employed analysis method (SC=Stepped Combustion, SP= Stepped Pyrolysis). In case of oxygen isotope, the analysis is normally done by mass spectrometric measurement of the oxygen, extracted by reaction of the sample with bromine pentafluoride.

Sample
The sample identification code, usually the catalog number of the institute or museum that has provided the material is given in this box. In case of density fractions, the density range is also shown here.

Remarks
Further remarks to the analysis or sample are shown in this box.

Isotopic compositions and C, N, H yields

Oxygen Isotopes
The isotopic compositions $\delta^{18}O$ (=$^{18}O/^{16}O$ ratio), $\delta^{17}O$ (=$^{17}O/^{16}O$ ratio), and $\Delta^{17}O$ (=$\delta^{17}O$ - 0.52 * $\delta^{18}O$ indicating the departure from the terrestrial fractionation line) are given in permil (%.) deviations from the *SMOW* (Standard Mean Ocean Water).

Carbon Isotopes and Yields
The total carbon yield in ppm released from the sample and its average $\delta^{13}C$ composition (=$^{13}C/^{12}C$ ratio) in permil (%.) relative to the *PDB* standard (PDB = Pee Dee belemnite fossile carbonate from the *Cretaceous Pee Dee* formation in South Carolina) is given.

Nitrogen Isotopes and Yields
The total nitrogen yield in ppm released from the sample and its average $\delta^{15}N$ composition (=$^{15}N/^{14}N$ ratio) in permil (%.) relative to the air standard is given.

Hydrogen Isotopes and Yields
The total hydrogen yield in ppm released from the sample and its average $\delta D/H$ ratio in permil (%.) relative to *SMOW* is given.

References
The literature reference to the used information is given in this box.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

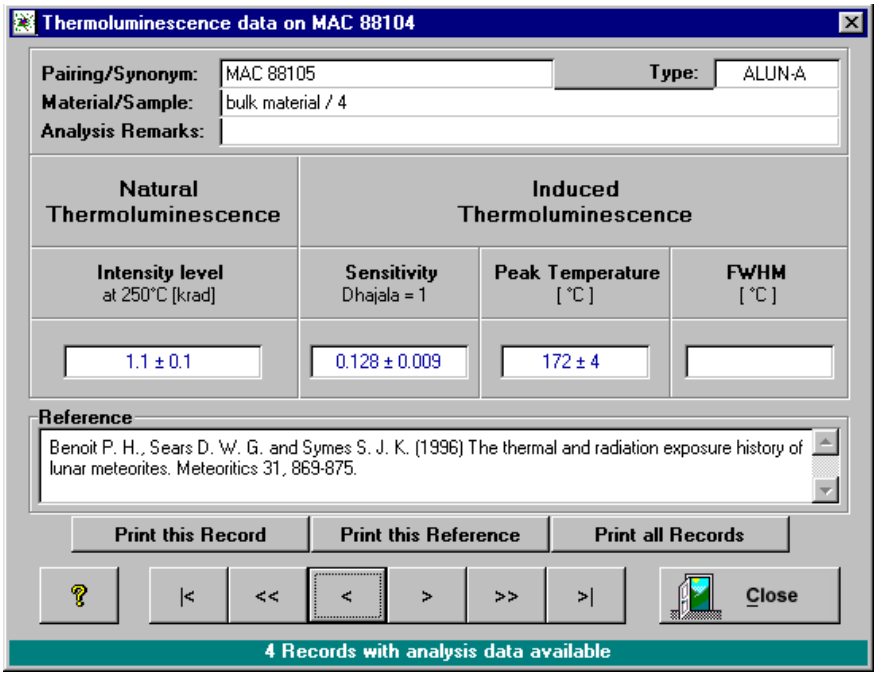
<Print all Records>
Choose this button to print all data of all available references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

Thermoluminescence (TL) Data

Choose the **<Thermoluminescence Data>** button to display published TL analysis results for the selected meteorite. The window shows natural TL intensity levels (NTL in krad at 250°C), induced TL sensitivity data (normalized to Dhajala or Kernouve) with the accompanying peak temperatures and FWHM values of stony meteorite bulk samples and silicate portions of stony-irons and iron meteorites.

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Type
The type classification of the selected meteorite is given.

Material/Sample
The kind of material analyzed (bulk material, separate, silicate) is displayed along with the sample identification code, which usually is the catalog number of the institute or museum that has provided the material

Analysis Remarks
Further remarks to the analysis or sample material are shown in this box.

Thermoluminescence Data
The natural TL intensity level is given in krad of light emmitted from the sample at a temperature of 250°C. This analysis technique is mainly applied to ordinary chondrite finds from Antarctica and gives an approximate measure for the terrestrial age and thermal/irradiation history of a meteorite.

The induced TL properties of a meteorite sample are characterized by three significant features of the glow curve, the TL sensitivity, normalized to a known standard (Dhajala for unequilibrated meteorites, Kernouve for equilibrated meteorites), the temperature where the TL maximum occurs (peak temperature) and the FWHM (full-width-at-half-mean) value of the peak curve. The measured samples has previosly to be annealed to 500°C to erase present natural TL and then exposed to a 250 mCi ^{90}Sr beta source until the absorbed dose amounts to 2.0 krad.

The induced TL properties are a measure for the metamorphism state of a meteorites and are primarily governed by the amount and structural state of containing feldspar. The induced TL sensitivity is an important parameter for the subtype classification of unequilibrated chondrites.

References
The literature reference to the used information is given in this box.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

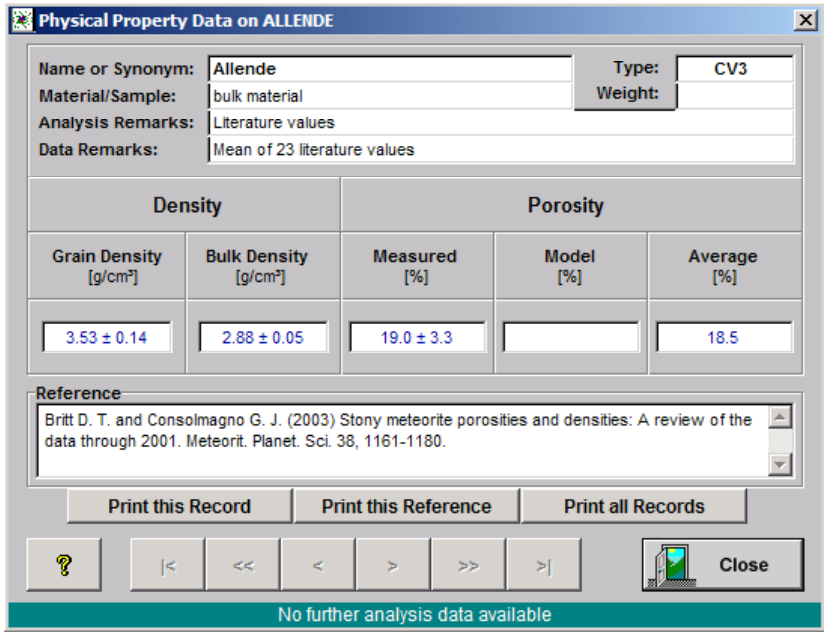
<Print all Records>
Choose this button to print all data of all available references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

Physical Property Data

Choose the **<Physical Properties>** button to display published density and porosity data for the selected meteorite. The window shows grain- and bulk density (both in g/cm³) as well as measured, model and average porosity (in %) for stony and stony-iron meteorites.

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Pairing/Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Type
The type classification of the selected meteorite is given.

Material/Sample
The kind of material analyzed (bulk material, separate, silicate) is displayed along with the sample identification code, which usually is the catalog number of the institute or museum that has provided the material

Analysis Remarks
Further remarks to the analysis are shown in this box.

Data Remarks
Further remarks to the provided analysis data are shown in this box.

Densitiy Data

a) Grain density (in g/cm³) is the density of the sample minerals contained, excluding pores
Formula: $\rho_g = M_g / V_g$
where
M_g = mass of the sample measured
V_g = measured volume of the sample excluding pores = grain volume

b) Bulk density (in g/cm³) is the density of the measured meteorite sample, including pores
Formula: $\rho_g = M_g / V_b$
where
M_g = mass of the sample measured
V_b = measured volume of the sample including pores = bulk volume

This analysis technique is mainly applied to stony meteorites.

Porosity Data

The porosity of a meteorite is defined as the percent fraction of the volume of a sample that is empty space.

Formula: $V_b - V_g$ or: $(1 - \rho_b / \rho_g) \times 100$

a) The measured porosity is the actual porosity of the sample measured
b) The model porosity is the estimated porosity of a sample based on the composition of the meteorite or meteorite type
c) The average porosity is calculated from the difference between the average grain and average bulk density

References

The literature reference to the used information is given in this box.

<Print this Record>
Choose this button to print only those data displayed in the current window. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print this Reference>
Choose this button to print only those data on the selected meteorite that was extracted from the shown reference. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

<Print all Records>
Choose this button to print all data of all available references of the selected meteorite. For using the **Print Record Dialog**, see under "Print Record" later in this Chapter.

Action Bar

Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

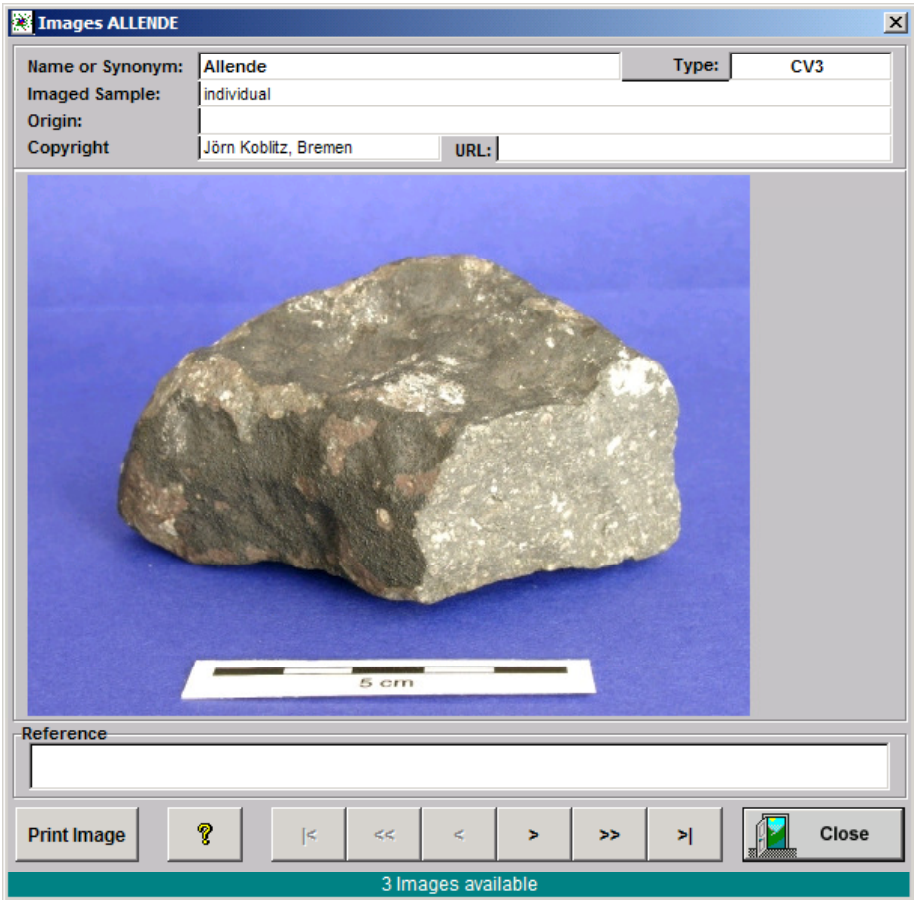
Choose the < Physical Properties > button to display published porosity and densitiy data results for the selected meteorite. The window shows bulk and grain densities (in g/cm³), and porosities (in percent). 1-sigma uncertainty values are included if known.

If there is more than one record available, you can scroll through the database using the Action Bar in the same manner as you do in the Detailed Meteorite Information Dialog. When you first enter the window, the total number of records available is shown in the bottom help line.

Meteorite Images

Choose the **<Pictures>** button to display

This push button is disabled if there are no analysis data available for the selected meteorite.



If there is more than one record available, you can scroll through the database using the **Action Bar** in the same manner as you do in the **Detailed Meteorite Information Dialog**. When you first enter the window, the total number of records available is shown in the bottom help line.

Name or Synonym
If the analysis has been done on a pairing or under a synonym of the selected meteorite, that name is displayed here.

Type
The type classification of the selected meteorite is given.

Imaged Sample
A brief description of the pictured specimen is shown here. Usually, this the weight or size of the specimen.

Origin
Information on the origin/source of the image is shown here

Copyright
In case that the image is copyright protected, the copyright is given

URL
In case that the image is accessible via the internet, the URL of the web page is given here.

References
In case that the image is published in printed form, the corresponding reference is given.

<Print Image>
Press this button to print the image and corresponding information.

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons later in this Chapter. Press **<Close>** to return to the previous window. If only a single record exists, all controls except the **<Close>** button are disabled.

Setting Order and Filter

The **Order/Filter box** contains two objects that control the kind of information displayed and its order of access when using the **Action Bar control buttons**.

Order Definition popup
Select this popup to display a list of criteria for ordering of the database. By default, the records are ordered alphabetically by meteorite name. For example, choose "date of fall/find" to order the database by the date of the find or fall. Choosing the **<Bottom>** button from the Action Bar will then show the most recently found or fallen meteorite. The database fields are always organized in ascending order, from A to Z for character strings, and from smallest to largest value for numeric types.

Filter Definition popup
Select this popup to display a list of filter conditions. Setting a filter will exclude all those records from being displayed that do not match the filter condition. For example, setting filter to "Observed Falls" will exclude all finds when scrolling through the database. This helps you to scan a data set of interest much faster. Setting a filter will automatically show the first record of the data set. No filter condition is set by default

It may happen that the scrolling through the database gets very slow, especially in case, when both, an order criteria and a filter condition are active at the same time. If this occurs, reset one of the two objects to default.

Record Selection

Locate popup

In most cases, you wish to view the information of a certain meteorite. To quickly locate this record, choose the **Locate popup** from the **Record Selection Box** and select "Meteorite Name" from the list.

An edit box is opened where you can now type the meteorite name (e.g. "Murchison") you want to have displayed. Press the **<Enter>** key to locate the record in the database. You do not have to type the entire meteorite name, but the string you enter must start with the first character of the meteorite name to locate (e.g. "Murch"). Thus, typing "urchison" will not locate the meteorite "Murchison". If you are not shure about the spelling of a meteorite name, try to use the **Record Selection Dialog** (see Chapter 8) instead in combination with the "LIKE" operator (for sub-string comparison). Example: You just know that the name of the meteorite you are looking for contains the string "town". There are about 15 meteorites known that contain "town" in its name. Using the Locate Utility will not find these entries in the database.

In those cases, where a record could not be found in the meteorite name database field, the program automatically searches the list of known synonyms. Example: when you enter the name "Tocopilla" the record of „North Chile" meteorite is located, since "Tocopilla" is a synonym of "North Chile".

You can also locate other type of information, like **country**, **state** or **year of discovery**. In those cases, the database is automatically ordered by the selected field type (locating a country will order the displayed records by country).

Select Meteorite button
Choosing the **<Select Meteorite>** button will open the **Record Selection Window**. Here you can extract certain pieces of data from the database. For information on using this dialog, see Chapter 8, Extracting Meteorite Data.

Action Bar

The Action Bar is a main feature that you will find in most *MetBase* windows. It gives you control over the way in which the records are accessed in the database. You can go to the first or to the last record in the database, or move forward or backward in it, slowly, record by record or speedy, in steps of 10. The sequence in which records are displayed depends on how the database is ordered (see under "Order/Filter" in this Chapter).

?	Press this button to open the help window
>	Press this button to go to the next record in the database. Hold down the hot key **<N>** or the **<Enter>** key to move forward.
<	Press this button to go to the previous record in the database. Hold down the hot key **<P>** or the **<Enter>** key to move backward.
>>	Press this button to skip 10 records in the database. Hold down the hot key **<+>** or the **<Enter>** key to quickly move forward.
<<	Press this button to go 10 record back in database. Hold down the hot key **<->** or the **<Enter>** key to quickly move backward.
|<	Press this button to go to the first record in the database.
>|	Press this button to go to the last record in the database.
Close	Press the **<Close>** button to return to the previous window.

Print Record

You can print the basic data, details and references and repository information of the currently selected meteorite. To print other analysis data, use the specific query dialogs from the Main Menu Page.

Choose the **<Print Record>** button to open the **Print Record Dialog** Window. Choose the output destination:

Output Destination

Select **<To Screen>** to **preview** the print form before sending it to the printer.

Select **<To Printer>** to send the output directly to your connected printer.

Select **<To File>** if you wish to print the report at a later time, for example if you do not have the printer connected to your PC.

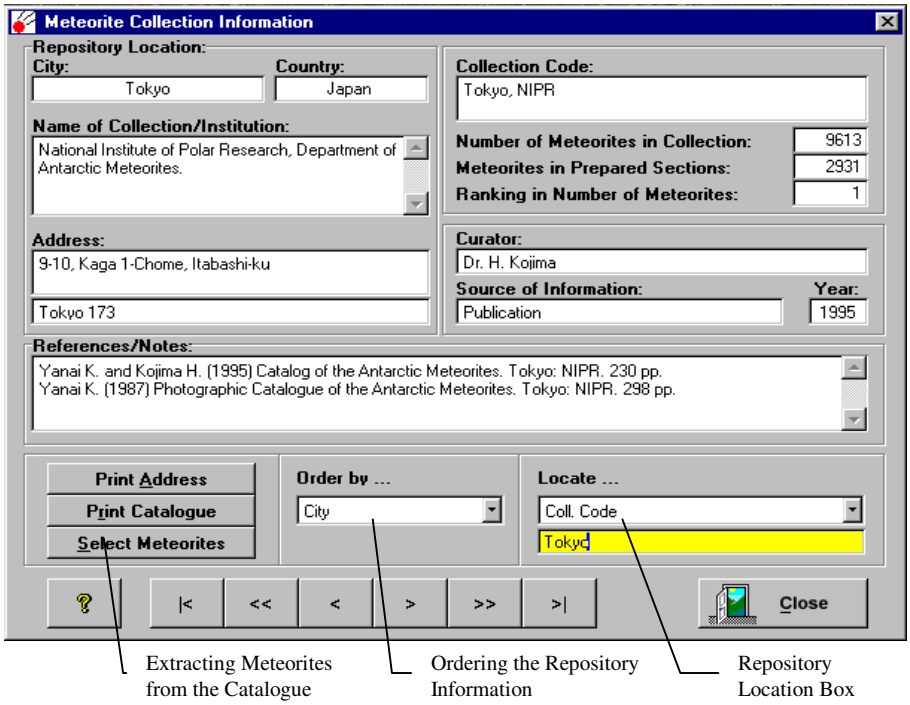
Basic Data Extraction

Choose this option from the **Main Menu Page** if you wish to extract meteorite records from the database. You will get into the same dialog window that is opened when you choose the **<Select Meteorite>** button from the **Detailed Meteorite Information Dialog**. For more information about using this dialog, see Chapter 8, Extracting Meteorite Data.

Chapter 4: Meteorite Collections

Collection Information

Choose this item from the Main Menu if you wish to print the catalogue of a meteorite collection and if you wish to view detailed information on a specific meteorite collection.



Repository Location box
The location of the selected repository with city, country, name of institution and address is displayed.

Collection Code
The collection code as used by the Repository Information window of the Detailed Meteorite Information Dialog (see Chapter 3, "Repository Information") is displayed in this field.

Total Number of Meteorites
This field shows the total number of meteorites in the selected collection.

Meteorites in Prepared Sections
This field shows the number of meteorites of which prepared sections (covered thin sections, polished thin sections, polished sections and mounts) are known to have been prepared.

Ranking in Meteorite Number
The collection ranking in terms of the total number of meteorites is displayed here. This number is not really a measure of the importance or value of the specific collection as it does not consider rarity and mass of the contained meteorites. The number gives the position relative to all 600+ repositories stored in *MetBase*.

Curator
The name of the person who curates the meteorite collection (commonly at time of information).

Source of Information
There are different kinds of information sources: printed catalogues, publications in journals, unpublished inventory lists and private communications.

Year
The year of the information, which is usually the year of collection inventory.

References/Notes
Author, year, title and source of the information used. Collection remarks are appended here

Order by... popup
Choose this popup to select an order condition for display of the collection information

Locate popup
You can quickly locate a specific repository, or a city or country of known meteorite repositories. Choose the Locate popup and select a field from the list. A box is opened where you can enter the expression you wish to locate. Press **<Enter>** to locate the record in the database. The database is automatically ordered by the selected field.

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. See description of individual buttons in Chapter 3, "Action Bar". Press **<Close>** to return to the previous window.

<Print Address>
To print the collection information as shown in the window, press this button to open the Print Record Dialog. For details, see under Chapter 3, "Print Record".

<Print Catalogue>
Pressing this button let *MetBase* assemble the catalogue of the specific meteorite collection. It includes meteorite name, date of fall or find, country, co-ordinates, classification, total known weight, total weight of each meteorite in collection and specimen remarks. When *MetBase* has finished the assembly, the **Report Dialog** is opened. Here you can order the catalogue by different criteria and choose between two different print forms (a detailed catalogue format or a compressed list format). For more information on using the Report Dialog, see Chapter 9, "Reporting Query Results." The available print forms are described as following:

This push button is disabled if there are no analysis data available for the selected meteorite.

Short Collection List
This form is printed as a table. The columns contain the meteorite name, date of fall/find, classification, total known weight, specimen weight and specimen remarks. If the meteorite was observed to fall, this is indicated by an asterisk (*). In the header of the table, the collection code, country of repository, date of information, and ordering criteria are displayed. A summary band at the end of the table shows the total number of meteorites and the total weight in the collection.

Prepared Sections List
This form is printed as a table. The columns contain the meteorite name, date of fall/find, classification, total known weight and the type of prepared section that is with the institution. If the meteorite was observed to fall, this is indicated by an asterisk (*). In the header of the table, the collection code, country of repository, date of information, and ordering criteria are displayed.

Catalogue Format
This print form includes the important basic meteorite data, i.e., name, location with coordinates, date of fall/find, classification, total known weight, specimen weight and remarks. Each meteorite record is using up at least 6 lines of the printed page. In the header of the table, the collection code, country of the repository, date of information, and ordering criteria are displayed. A summary band at the end of the table shows the total number of meteorites and the total weight in the collection.

<Select Meteorites>
Choosing this button will open the **Record Selection Dialog**, where you can extract specific meteorite records from the collection's catalogue. For more information on using this dialog, see Chapter 8, "Extracting Meteorite Data."

This push button is disabled if there are no analysis data available for the selected meteorite.

Collection Overview

Choose this option from the Main Menu Page if you wish to get an overview about the repositories and collections stored in *MetBase*. Define selection criteria in order to extract records, for example, displaying only the meteorite collections in Germany. If you wish to display all repositories, do not enter a selection condition, just press the **<Check>** or **<Report>** button. The list of repositories with the total number of meteorites and ranking position is shown. For more information about using the **Record Selection Dialog**, see Chapter 8, "Extracting Meteorite Data."

Chapter 5: Analysis Data

Mineral Chemistry

Choose this option from the Main Menu Page if you mainly wish to extract **mineral analysis data** from the database. The **Record Selection Dialog** is opened, where you can define selection criteria for data retrieval. The accessible database fields in the **Expression Builder Box** and the print forms that can be chosen from the **Report Dialog** (see Chapter 9, "Reporting Query Results") are the same as found in the **Basic Data Extraction Dialog** (see Chapter 3, "Basic Data Extraction"), but the table, which can be browsed of the query result, contains mainly mineral chemistry and classification data.

When you choose the **<Check>** button after definition of the selection criteria, the **browse window** will display a table of the query result with meteorite name, country, classification, olivine Fa, pyroxene Fs, total Fe content, shock classification and weathering category. For more information about using the **Record Selection Dialog**, see Chapter 8, "Extracting Meteorite Data".

Bulk Chemical Analyses

Choose this option from the Main Menu Page if you wish to extract **bulk chemical analysis data of stony meteorites and the silicate portions of stony-iron meteorites** from the database. Only in this dialog you can extract bulk analysis data by setting upper and lower limits for component concentrations (for example, selecting all those analysis records where the total Fe content is between 20 and 22 wt.%).

When you define selection criteria including database fields, that contain component concentrations, always try to specify a range of two values using the ">" ("≥") and "<" ("≤") operators in the expressions. This prevents empty fields from being included in the query result. (for example: *total Iron [wt.%]* **>** 20 **AND** *total Iron [wt.%]* **<** 22).

When you choose the **<Check>** button after definition of the selection criteria, the **browse window** will display a table of the query result with meteorite name, type classification, contents of SiO_2, TiO_2, Al_2O_3, Fe_2O_3, FeO, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, H_2O^+, H_2O^-, Fe (metal), Ni, Co, FeS, C, total, total Fe, sample, reference symbol, analyst, and Remarks. For more information on using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data". For further information on bulk chemical analyses, see Chapter 3, "Detailed Meteorite Information - Bulk Chemical Analyses".

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully (for description of the Report Dialog, see Chapter 9). You can define up to two criteria to order the records and you have the choice between three different forms to preview and print the extracted information:

Print Report Forms:

Bulk Analysis/Compressed
Prints the extracted data in a table. All meteorite analysis records are listed row by row. The contents of chemical components are given in columns with the type classification and the reference symbol. At the end of the table, a statistical summary is printed, with min., max., average value and standard deviation. Because of the width of all columns, this table can only be printed in **Landscape format**. To display the meaning of the reference symbol, choose the "**Analysis References**" print form radio button. You can print this information separately.

Bulk Analysis/Detailed
Prints the extracted data in a table. The analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The contents of the chemical components are given in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table together with analysis remarks. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in **Landscape format**.

Analysis References
Prints the list of all literature references for the extracted data. The complete reference text is given together with the reference symbol used in the *MetBase* tables/browse window.

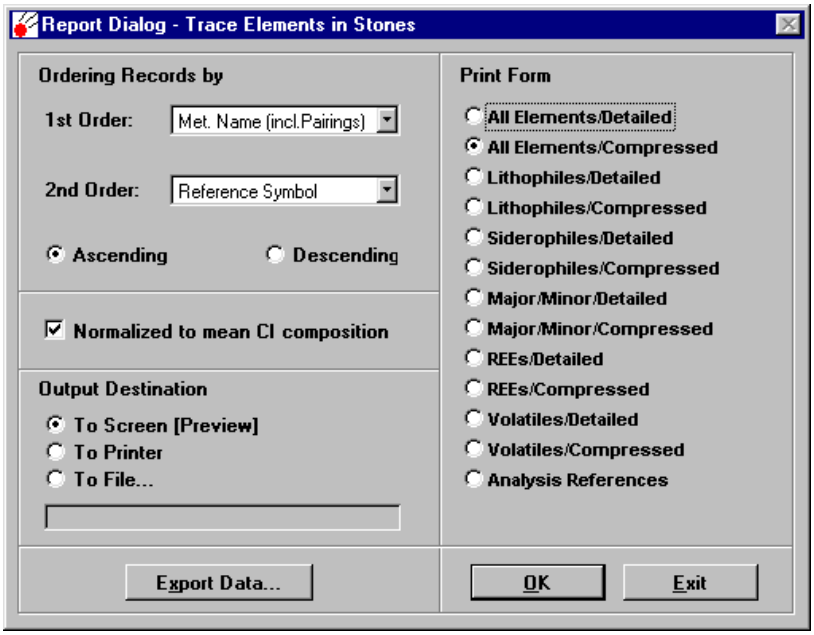
Trace Elements in Stones

Choose this option from the **Main Menu Page** if you wish to extract from the database, major, minor and trace element data obtained from whole rock samples of stony meteorites or clasts and silicate fractions of stone, stony-iron and iron meteorites. Only in this dialog you can extract information by setting upper and lower limits for element concentrations (for example, selecting all those analysis records where the Scandium content is between 9.0 and 9.7 (µg/g).

When you define selection criteria including database fields, that contain element concentrations, always try to specify a range of two values using the ">" (">=") and "<" ("<=") operators in the expressions. This prevents empty fields from being included in the query result. (for example: *Sc Concentration (µg/g)* > 9.0 **AND** *Sc Concentration* (µg/g) < 9.7).

When you choose the **<Check>** button after you have defined the selection criteria, the browse window will display a table of the query result with meteorite/pairing name, type classification, up to 76 element concentrations, sample designation and remarks, data remarks, analysis method and remarks, and reference symbol.

When you choose the **<Report>** button, the **Report Dialog Window** appears after the query is performed successfully. You can define up to two criteria to order the records and you have the choice between four different forms to preview and print the extracted information.



Print Report Forms:

All Elements/Detailed
Prints the whole set of element abundances obtained in the query. The records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The sample designation and material type, employed analysis method, workgroup, and data remarks are printed for each analysis on top of the element data block. The element concentrations are given in columns and ordered by atomic number. If the CI normalization box was checked, all values are printed relative to their average CI abundances. Fields with no available analysis data are left blank. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records.

All Elements/Compressed
Prints the whole set of element abundances obtained in the query. The meteorite name, type classification, sample designation and material type, employed analysis method, workgroup, and data remarks are printed for each analysis on top of the element data block. The element concentrations are given in columns and ordered by atomic number. If the CI normalization box was checked, all values are printed relative to their average CI abundances. Fields with no available analysis data are left blank. A separate line with the reference text is given after each set of records.

Lithophiles/Detailed
Prints only the lithophile element data of the query result. The records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The sample designation and material type, employed analysis method, data remarks, reference symbols, and element concentrations are given in columns. In each column, two elements had to be arranged in row pairs, because of the limited table width. If the CI normalization box was checked, all element values are printed relative to their average CI abundances. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. Because of the width of all columns, this table can only be printed in Landscape format.

Siderophiles/Detailed
Prints only the siderophile element data of the query result. This table format is the same as the <Lithophiles/Detailed> table format.

Siderophiles/Compressed
Prints only the siderophile element data of the query result. This table format is the same as the <Lithophiles/Compressed> table format.

Major/Minor/Detailed
Prints only the major and minor element data of the query result. This table format is the same as the <Lithophiles/Detailed> table format.

Major/Minor/Compressed
Prints only the major and minor element data of the query result. This table format is the same as the <Lithophiles/Compressed> table format.

REEs/Detailed
Prints only the set of rare earth element data of the query result. This table format is the same as the <Lithophiles/Detailed> table format.

REEs/Compressed
Prints only the set of rare earth element data of the query result. This table format is the same as the <Lithophiles/Compressed> table format.

Volatiles/Detailed
Prints only the mobile and volatile trace element data of the query result. This table format is the same as the <Lithophiles/Detailed> table format.

Volatiles/Compressed
Prints only the mobile and volatile trace element data of the query result. This table format is the same as the <Lithophiles/Compressed> table format.

Analysis References
Prints the list of literature references for the extracted data. The complete reference text is given together with the reference symbol used in the MetBase tables/browse window.

Trace Elements in Irons

Choose this option from the Main Menu Page if you wish to extract **trace element data of irons and stony-iron meteorites** from the database. Only in this dialog you can extract analysis data of the metal phase by setting upper and lower limits for element concentrations (for example, selecting all those analysis records where the Gallium content is between 6.3 and 7.2 µg/g).

When you define selection criteria including database fields, that contain element concentrations, always try to specify a range of two values using the ">" ("≥") and "<" ("≤") operators in the expressions. This prevents empty fields from being included in the query result. (for example: *Ni Concentration [mg/g]* **>** 10.5 **AND** *Ni Concentration [mg/g]* **<** 50).

When you choose the **<Check>** button after definition of the selection criteria, the **browse window** will display a table of the query result with meteorite name, chemical group, Ni, Ga, Ge, Ir, Co, Cr, Cu, As, Sb, W, Re, Pt, Os, Pd, Rh, Ru, Au, P concentrations, analysis remarks and reference symbol. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data". For further information on noble gas data, see Chapter 3, "Detailed Meteorite Information - Noble Gas Contents".

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully (for description of the Report Dialog, see Chapter 9). You can define up to two criteria to order the records and you have the choice between four different forms to preview and print the extracted information:

Print Report Forms:

Trace Elements/Compressed
Prints the extracted data in a table. All meteorite analysis records are listed row by row. The concentrations of up to 15 elements are given in columns, with classification, analysis remarks and kamacite bandwidth. For the reference citation, only the reference symbol is given in the last column. Because of the width of all columns, this table can only be printed in **Landscape format**. To display the meaning of the reference symbol, choose the "**Analysis References**" print form radio button. You can print this information separately.

Trace Elements/Detailed
Prints the extracted data in a table. The analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The concentrations of up to 15 elements are given in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in **Landscape format**.

Trace Elements/Selection
Prints the extracted data in a table. The analysis records are listed row by row. The concentrations of nickel and a selection of important trace elements for classification (Ga, Ge, Ir, Co, As, Cu, and Au) are displayed in columns. For the reference citation, only the reference symbol is given in the last column.

Analysis References

Prints the list of all literature references for the extracted data. The complete reference text is given together with the reference symbol used in the MetBase tables/browse window.

Noble Gas Isotopes

Choose this option from the Main Menu Page if you wish to extract **noble gas isotope data** from the database. Only in this dialog you can extract information by setting upper and lower limits for noble gas isotopic concentrations and its ratios (for example, selecting all those analysis records where the 4He/3He ratio is between 950 and 1150).

When you define selection criteria including database fields, that contain noble gas isotope concentration or ratio data, always try to specify a range of two values using the ">" (”≥“) and "<" (”≤“) Operators in the expressions. This prevents empty fields from being included in the query result. (for example: ^{21}*Ne Concentration* **>** 1.9 **AND** ^{21}*Ne Concentration* **<** 2.3).

When you choose the **<Check>** button after you have defined selection criteria, the **browse window** will display a table of the query result with meteorite name, classification, ^{3}He, ^{4}He, ^{20}Ne, ^{21}Ne, ^{22}Ne, ^{36}Ar, ^{38}Ar, ^{40}Ar concentrations, ^{4}He/^{3}He, ^{3}He/^{21}Ne, ^{3}He/^{38}Ar, ^{20}Ne/^{22}Ne, ^{22}Ne/^{21}Ne, ^{36}Ar/^{38}Ar ratios, sample remarks and reference symbol. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data". For further information on noble gas data, see Chapter 3, "Detailed Meteorite Information - Noble Gas Contents".

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully (for description of the Report Dialog, see Chapter 9). You can define up to two criteria to order the records and you have the choice between three different forms to preview and print the extracted information:

Print Report Forms:

Noble Gases/Compressed
Prints the extracted data in a table. All meteorite analysis records are listed row by row. The noble gas concentrations of 8 isotopes, the isotopic ratios calculated from the concentration values, meteorite name, classification, and analysis sample remarks are displayed in columns. For the reference citation, only the reference symbol is given in the last column. If the meteorite was observed to fall, this is indicated by an asterisk (*), printed in front of the meteorite name. Because of the width of all columns, this table can only be printed in **Landscape format**. To display the meaning of the reference symbol, choose the "**Analysis References**" print form radio button. You can print this information separately.

Noble Gases/Detailed
Prints the extracted data in a table. The analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The noble gas concentrations of 8 isotopes, the isotopic ratios calculated from the concentration values, and analysis sample remarks are displayed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in **Landscape format**.

Analysis References
Prints the list of all literature references for the extracted data. The complete reference text is given together with the reference symbol used in the *MetBase* tables/browse window.

Cosmogenic Nuclides

Choose this option from the Main Menu Page if you wish to extract **cosmogenic nuclide data** and **terrestrial ages** from the database. Only in this dialog you can extract information by setting upper and lower limits for radionuclide activities, cosmogenic noble gas concentrations and ratios, or terrestrial ages (for example, selecting all those analysis records where the ^{10}Be activities are between 10 and 15 dpm/kg)

When you define selection criteria with database fields, that contain activity or concentration data, always try to specify a range of two values using the ">" (”≥“) and "<" (”≤“) Operators in the expressions. This prevents empty fields from being included in the query result. (for example: *^{10}Be (dpm/kg)* **>** 10 **AND** *^{10}Be (dpm/kg)* **<** 15).

When you choose the **<Check>** button after definition of the selection criteria, the **browse window** will display a table of the query result with meteorite name, classification, ^{10}Be, ^{26}Al, ^{36}Cl, ^{53}Mn, ^{41}Ca, ^{14}C activities, $^{21}Ne_c$ concentration, $^{22}Ne/^{21}Ne_c$ and $^{4}He/^{21}Ne_c$, ratios, reference symbol, sample number, material type, and analysis remarks. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data". For further information on noble gas data, see Chapter 3, "Detailed Meteorite Information - Cosmogenic Nuclides".

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully (for description of the Report Dialog, see Chapter 9). You can define up to two criteria to order the records and you have the choice between nine different forms to preview and print the extracted information:

Print Report Forms:

All Data/Detailed
Prints the extracted data in a table. All analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The noble gas concentrations of 8 isotopes, the isotopic ratios calculated from the concentration values, and analysis sample remarks are displayed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in **Landscape format**.

All CRN/Compressed
Prints the extracted data in a table. The analysis records are listed row by row. All cosmogenic radionuclide data, terrestrial ages, meteorite/pairing names, sample identification number, type classification, reference symbols, and analysis remarks are given in columns. Because of the width of all columns, this table can only be printed in **Landscape format**. To display the meaning of the reference symbol, choose the "**References/CRN & Ages**" print form radio button.

CRN & CNG/Compressed
Prints the extracted data in a table. The analysis records are listed row by row. ^{10}Be, ^{26}Al, ^{36}Cl and ^{53}Mn activities, $^{21}Ne_c$ concentration, $^{22}Ne/^{21}Ne_c$ and $^{4}He/^{21}Ne_c$, ratios, meteorite/pairing names, sample identification number, type classification, analysis remarks, and reference symbols for both cosmogenic radionuclides and noble gases are given in columns. Because of the width of all columns, this table can only be printed in **Landscape format**. To display the meaning of the reference symbol, choose the "**References/CRN & Ages**" print form radio button.

CNG Only/Detailed
Prints the extracted data in a table. This print form is the same like the **All Data/Detailed** form, but in contrast to that, it will only print those records that contain **cosmogenic noble gas data**.

CNG Only/Compressed

Prints the extracted data in a table. This print form is the same like the **CRN & CNG/Compressed** form, but in contrast to that, it will only print those records that contain **cosmogenic noble gas data**.

Ages Only/Detailed
Prints the extracted data in a table. This print form is the same like the **All Data/Detailed** form, but in contrast to that, it will only print those records that contain **terrestrial ages**.

Ages Only/Compressed
Prints the extracted data in a table. This print form is the same like the **CRN & Ages/Compressed** form, but in contrast to that, it will only print those records that contain **terrestrial ages**.

References/CRN & Ages
Prints the list of all literature references for the extracted **cosmogenic radionuclide and terrestrial age data**. The complete reference text is given together with the reference symbol used in the *MetBase* tables/browse window. To display reference information on the noble gas data, choose the **References/CNG** print form.

References/CNG
Prints the list of literature references for the extracted **cosmogenic noble gas data**, only. The complete reference text is given together with the reference symbol used in the *MetBase* tables/browse window.

Light Stable Isotopes

Choose this option from the **Main Menu Page** if you wish to extract **oxygen**, **nitrogen**, **carbon** or **hydrogen isotope data** for meteorite bulk samples and separates. Only in this dialog you can extract information by setting upper and lower limits for light stable isotopic compositions (for example, selecting all those records with oxygen isotopic composition in the range between -4.5 and -1.7 %. rel. SMOW)

When you define selection criteria with database fields, that contain isotope data, always try to specify a range of two values using the ">" (">=") and "<" ("<=") operators in the expressions. This prevents empty fields from being included in the query result. (for example: *d 18-O* > -4.5 AND *d 18-O* < -1.7).

When you choose the **<Check>** button after definition of the selection criteria, the browse window will display a table of the query result with meteorite name, classification, $\delta^{17}O$, $\delta^{18}O$, $\Delta^{17}O$, $\delta^{13}C$, C content, $\delta^{15}N$, N content, $\delta D/H$, H content, reference symbol, sample designation, material type, and analysis method and remarks.

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully. You can define up to two criteria to order the records and you have the choice between nine different forms to preview and print the extracted information.

Print Report Forms:

Oxygen Isotopes/Detailed
Prints only the oxygen isotope data in a tabular format. All records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The oxygen isotopic compositions, sample and analysis remarks are displayed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records.

Oxygen Isotopes/Compressed
Prints only the oxygen isotope data in a tabular format. The records are listed row by row. The oxygen isotopic compositions, meteorite/pairing names, sample identification numbers, type classifications, reference symbols, and analysis remarks are printed in columns. To display the complete reference information, choose the <Analysis Reference> print form radio button.

C/N/H Isotopes/Detailed
Prints only the carbon, nitrogen, and hydrogen isotope data in a tabular format. Query results including oxygen isotope data are not considered. All records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The oxygen isotopic compositions, sample and analysis remarks are displayed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in Landscape format.

C/N/H Isotopes/Compressed
Prints only the carbon, nitrogen, and hydrogen isotope data in a tabular format. The records are listed row by row. The isotopic compositions, released C, N, and H contents, meteorite/pairing names, sample identification numbers, type classifications, reference symbols, and analysis remarks are printed in columns. To display the complete reference information, choose the <Analysis Reference> print form radio button. Because of the width of all columns, this table can only be printed in Landscape format.

All Isotopes/Detailed
Prints light stable isotope data in a single table. All records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The isotopic compositions, released C, N, and H contents, sample and analysis remarks are displayed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in Landscape format.

Analysis References
Prints the list of literature references for the extracted data. The complete reference text is given together with the reference symbol used in the MetBase tables/browse window.

TL Data

Choose this option from the **Main Menu Page** if you wish to extract **Natural** and **Induced TL data** from the database. Only in this dialog you can extract this kind of information by setting upper and lower limits for natural TL intensities or induced TL sensitivities (for example, selecting all those records with a natural TL intensity level in the range between 0.1 and 1.0 krad)

When you define selection criteria with database fields containing TL data, always try to specify a range of two values using the ">" (">=") and "<" ("<=") operators in the expressions. This prevents empty fields from being included in the query result. (for example: *NTL Level (krad/250°C)* >= 0.1 AND *NTL Level (krad/250°C)* <= 1.0).

When you choose the **<Check>** button after definition of the selection criteria, the browse window will display a table of the query result with meteorite name, type classification, natural TL intensity level, induced TL sensitivity, normalization standard, peak temperature, FWHM value, reference symbol, sample designation, material type and remarks.

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully. You can define up to two criteria to order the records and you have the choice between nine different forms to preview and print the extracted information.

Print Report Forms:

TL Data/Detailed
Prints the extracted thermoluminescence data in a table. All analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The natural TL intensities and the induced TL sensitivities (normalized to Dhajala or Kernouve) together with the peak temperatures and FWHM values are printed in columns. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in the first column of the table together with the sample designation. Analysis remarks are listed in the last column. A separate line with the reference text (without title) is given after each set of records. Because of the width of all columns, this table can only be printed in Landscape format.

TL Data/Compressed
Prints the extracted thermoluminescence data in a compressed tabular format. The analysis records are listed row by row. All TL data, meteorite/pairing names, sample designations, type classification, reference symbols, and analysis remarks are printed in columns. Because of the width of all columns, this table can only be printed in Landscape format. To display the complete reference text, choose the <Analysis References> print form radio button.

Analysis References
Prints the list of literature references for the extracted data. The complete reference text is given together with the reference symbol used in the MetBase tables/browse window.

Physical Properties

Choose this option from the **Main Menu Page** if you wish to extract **Physical Densitiy** and **Porosity** data for stony and stony-iron meteorites from the database. Only in this dialog you can extract this kind of information by setting upper and lower limits for grain- or bulk density as well as measured-, model- or average porosity (for example, selecting all those records with bulk densities in the range between 3.45 and 3.55).

When you define selection criteria with database fields containing density or porosity data, always try to specify a range of two values using the ">" (">=") and "<" ("<=") operators in the expressions. This prevents

empty fields from being included in the query result. (for example: *grain density (g/cm³) >= 3.45* AND *grain density (g/cm³) <= 3.55).*

When you choose the **<Check>** button after definition of the selection criteria, the browse window will display a table of the query result with meteorite name, type classification, material type (MA), sample#, grain density, bulk density, measured porosity, model porosity, average porosity, reference symbol, method, and analysis- and data remarks.

When you choose the **<Report>** button, the Report Dialog appears after the query is performed successfully. You can define up to two criteria to order the records and you have the choice between nine different forms to preview and print the extracted information.

Print Report Forms:

Physical Properties/Detailed
Prints the density and porosity data in a table. All analysis records are grouped by meteorite name. The basic information on each meteorite is given in a separate box preceding the analysis data. The densitiy (bulk and grain) and porositiy (measured, model and average) values are printed below, together with further information like sample material, sample weight, or analysis remarks. If the analysis has been published under a synonym or pairing name of the meteorite, that name is displayed in a separate row. A separate line with the reference text (without title) is given after each set of records.

Physical Properties/Compressed
Prints the extracted physical property data in a compressed tabular format. The analysis records are listed row by row. Not all the information available can be printed in this form. Only density and porosity data, meteorite/pairing names, type classification, reference symbol, and analysis remarks are shown. To display the complete reference text, choose the <Analysis References> print form radio button.

Analysis References
Prints the list of literature references for the extracted data. The complete reference text is given together with the reference symbol used in the MetBase tables/browse window.

Chapter 6: Statistics

In this menu box you can find some helpful options to perform statistical calculations, like abundance of classification groups with weight summaries or annual meteorite fall/find frequencies. In all offered dialogs, you can set selection criteria, for example, doing the statistical calculation just on Antarctic meteorites or just on observed falls.

Main Group Classification

Choose this option from the Main Menu Page if you wish to do a statistical calculation on meteorite main group classifications (L, H, CV, HED, IIIAB...) After you have set a selection criteria (which you do not have to do if you want to include all known meteorites), *MetBase* will group the query result according to the main group classification symbols used in *MetBase*. This means, that all meteorites which belong to the same main group (e.g., all L3, L4, L5 and L6 chondrites are members of L main group) are counted and the result is displayed in one line with the weight sum, and the minimum, maximum, mean, and mean excluding the minimum and maximum value, of all group members. All weights are calculated in kilograms. Meteorites that are **paired** are **counted as one** in this statistic. Choose the **<Check>** button will display the query result in the **browse window** in tabular form. N/A. is displayed in the mean-min./max. column when there are not enough counts to calculate a value. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data". For further information on noble gas data, see Chapter 3, "Detailed Meteorite Information - Noble Gas Contents".

Classification/Subtype

Choose this option from the Main Menu Page if you wish to do a statistical calculation on meteorite classification groups, including all subtype classifications (e.g., LL3.6, CO3.2, C2-AN,...) After you have set a selection criterion (which you do not have to do if you want to include all known meteorites), *MetBase* will group the query result according to the classification symbols used in *MetBase*. This means, that all meteorites which belong to the same group are counted and the result displayed in one line with the weight sum, and the minimum, maximum, mean, and mean excluding the minimum and maximum value, of all group members. All weights are calculated in kilograms. **Paired meteorites** are grouped together and **counted as one** single fall in this statistic. Choose the **<Check>** button to display the query result in the **browse window** in tabular form. N/A. is displayed in the mean-min./max. column when there are not enough counts to calculate a value. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data".

Shock Classifications

Choose this option from the Main Menu Page if you wish to have a statistical survey of shock classifications. Choose the **<Check>** button to display the query result in the **browse window.** The query result will be transformed into a table with six columns, showing in each column the total number of meteorites that are classified into **shock stages S1 to S6**. The first column contains the **main type classifications** and the second column the total number of shock classified meteorites of the specific type. The number of rows is determined by the number of main type classification groups. Intermediate petrological types, like L5/6 (or L5-6 in case of breccias), are grouped into the corresponding lower petrological type (e.g., L5). Paired meteorites are grouped together and counted as a single fall. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data".

Annual Falls/Finds

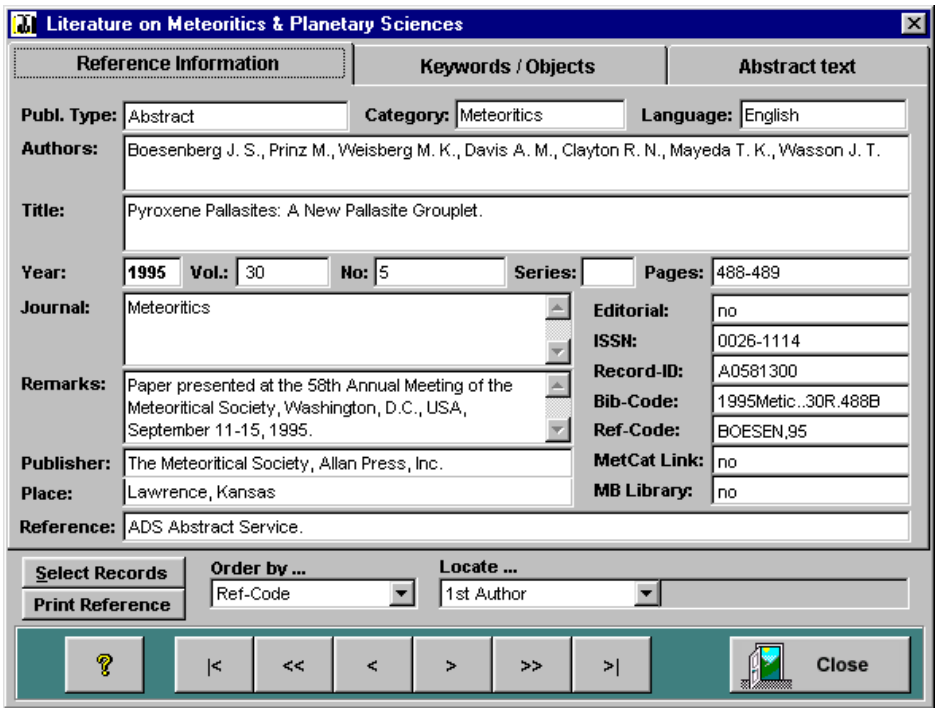
Choose this option from the Main Menu Page if you wish to do a statistical calculation on annual meteorite falls and finds. All Meteorite finds and observed falls are grouped by their calendar year of discovery. Choose the **<Check>** button to display the query result in the **browse window** in tabular form. The table includes the columns year, total count, selected count and percentage of total count, total weight sum, selected weight sum and percentage of total weight sum. If you set a selection criterion, the query result will only show those years that comprise at least one selected meteorite count. If you, for example, select the meteorite "Allende", only the year 1969 (the year of the Allende fall) is displayed. The table shows that it was one of 58 meteorites recovered in that year and that its mass was 78% of the total mass of all meteorites of that year. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data".

Country Statistics

Use this statistical utility to get an overview of the total number, total known weights, and types of all meteorites that have been recovered in a certain country. If you do not specifiy a country in the query, all countries, from which meteorites have been reported are listed in a table. Choose the **<Check>** button to display the query result in the **browse window.** The first column contains the country name, the second column the total number of recovered meteorites. The next columns contain the total weight sum, the mean total weight, the number of falls and finds, the number of stones, irons, stony-irons, ordinary chondrites, and achondrites. For more information about using the Record Selection Dialog, see Chapter 8, "Extracting Meteorite Data".

Chapter 7: Bibliography on Meteoritics and Planetary Sciences

The **Bibliography on Meteoritics and Planetary Sciences** contains the most comprehensive compilation of literature references on the subjects meteorites, meteors, interplanetary dust, tektites, impact cratering, lunar geology, asteroids, martian geology, and venusian geology, from as early as 1492 up to the present time. The database is keyword indexed and holds the names of objects studied in the original publication (e.g., meteortie names, crater names, Apollo lunar rock ID numbers).



To get into the Literature Survey Page frame, press the **<Literature Information>** button of the **Main Menu Page**. The **Literature Information** Window is displayed. The page frame contains 3 separate pages arranged in a filing-cabinet style. By default, the **Reference Information** page is the top-most page, displayed when opening this dialog.

Reference Information

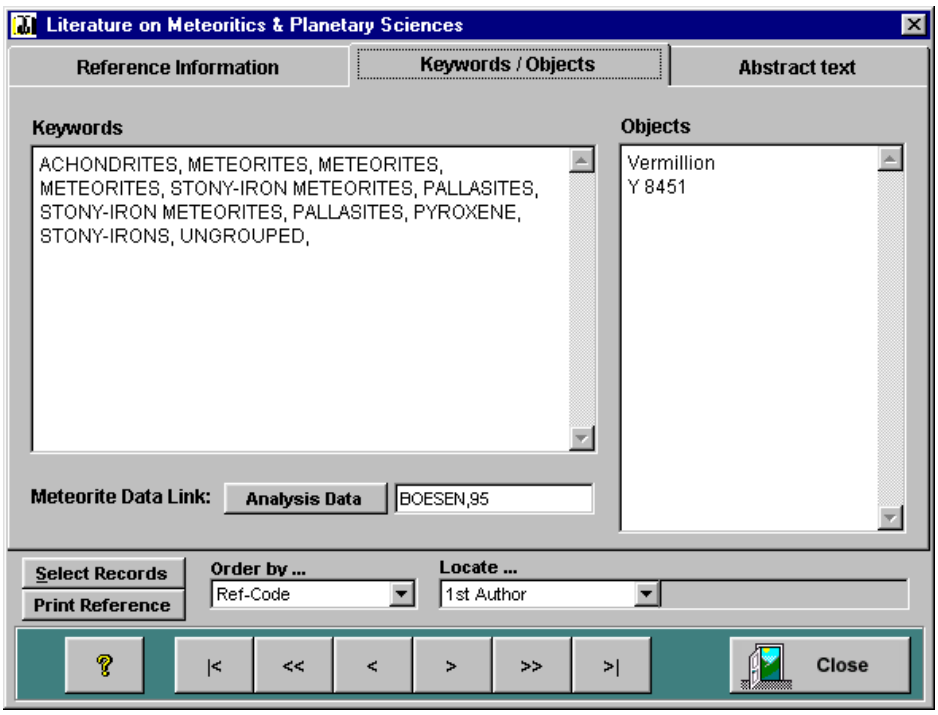
the Reference Information page provides all basic information on the selected publication, such as:

Publication type	*article, abstract, book, catalogue, conference volume, special print, dissertation, letter/note, newspaper column, pamphlet, map, picture, juvenile literature, chapter in book, chronicle, editorial, comment/reply, book review, bibliography*
Category (main topic)	*meteorites (incl. origin of the solar system, cosmochemistry), meteors/meteoroids, tektites, impact cratering, lunar geology, interplanetary dust (IDPs), comets, Mars, Venus, Mercury, asteroids, general planetology, planet earth*
Language	the language of the original publication text *English, French, Spanish, German, Russian, Latin, Italian, Chinese, Japanese, Polish, Swedish, Dutch, Portuguese, and approx. 15 others*
Title	the title as published. In case of non-English titles, the english translation is usually given in brackets
Volume, Number, Series	the journal's volume, number and series is given if applicable

Pages	the page range for an article or abstract, the total number of pages for books and special prints
Remarks	further details and references, e.g., the conference place for a presented paper
Publisher and Place	the publisher name and place of publication (publisher's place)
Editorial	*Yes* is given if the publication is published under editorship
Record-ID	each reference record was given a unique, 8-digit ID-code
Ref-Code	the reference code is shown if there is analysis information stored in MetBase for a given reference (the data are accessible via the *keywords/objects* page)
Authors	the names of the first author and the coauthors are given (e.g., *Wasson J. T.*)
Year	the year of publication
Journal	the journal name (e.g., *Meteorit. Planet. Sci.*)
Reference	the bibliographic source of the reference is given here (e.g. *ADS Abstract Service*)
ISSN	the ISSN number of a journal (ISBN numbers are not supplied)
Bib-Code	the record ID of the original source of the reference is supplied
MetCat-Link	Yes is given if the selected reference is also cited in the *Detailed Meteorite Information* Window
MB Library	Yes is given if the original publication or a xerox copy is present in the *MetBase Library*, Fischerhude, Germany

Keywords and Objects Information

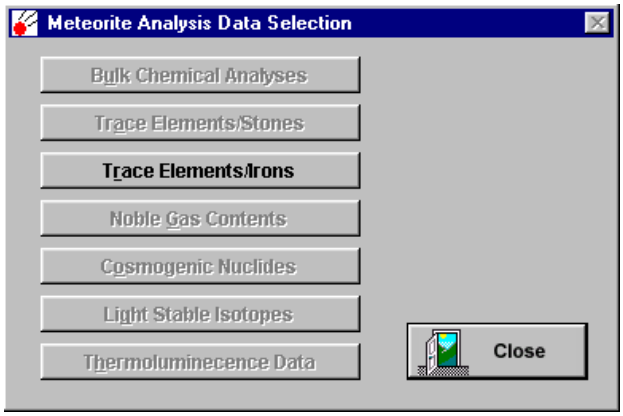
By clicking with the mouse pointer on the **Keywords/Objects** text on top of the page frame (the middle filing card), a new text page with the keywords and objects lists is displayed.
Further, if there is analysis data stored with MetBase, the **<Analysis Data>** button is enabled and the dedicated information can be accessed through this portal.



Keywords
Keywords are provided for all literature references in order to enhance the data retrieval power (for details on the query function, see Chapter 8, "Extracting Meteorite Data"). In some cases, especially when the original publication wasn't accessible for us, keywords were derived from the title text of the reference. All Keywords are given in upper case letters and are separated from each other by a comma. There are around 10,000 keywords supplied in total.

Objects
The names given in this list box are the objects treated/studied in the original publication. For publications in the field of meteoritics, objects studied are usually meteorites and their names are provided if known. Publications in lunar science often contain the ID numbers of Apollo or Luna rock samples (e.g., 24101, 74001). References to publications on impact cratering and tektites often include the impact crater name. (terrestrial craters only!)

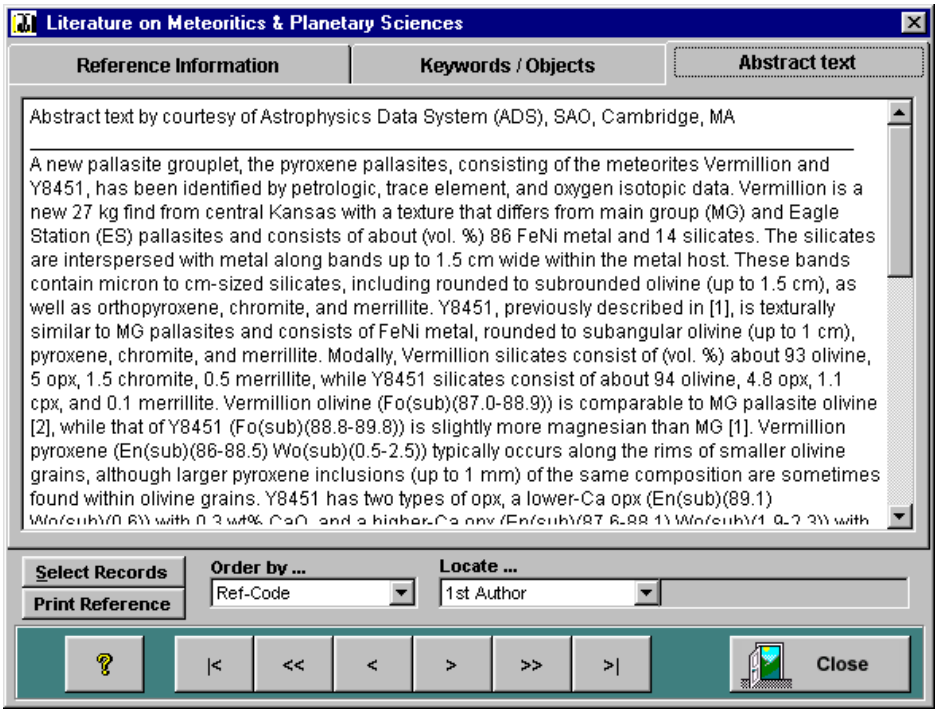
Analysis Data Link
If analysis data provided with a specific publication is stored in another database section of *MetBase* (e.g., noble gases, trace elements, light stable isotopes, cosmogenic radionuclides, bulk chemical compositions, TL data), a link to such a database table can be established by pressing the enabled **<Analysis Data>** button. The reference code (the combination of author name and two-digit year) is displayed in the text box to the right of the button. The **Meteorite Analysis Data Selection** Window is opened and you can display the kind of information you are looking for by choosing the data type button. Disabled buttons indicate that there are no data available of the specific indicated type.



Abstract Text

The abstract text of the selected literature reference is shown on the last, 3rd filing card , if available (card access is disabled if there is no abstract information provided for the selected reference record).

Most of the abstract text was kindly provided by the *ADS Abstract service* of the *Smithsonian Astrophysical Observatory, Cambridge, Mass.*


Literature on Meteoritics & Planetary Sciences
Reference Information
Keywords / Objects
Abstract text
Abstract text by courtesy of Astrophysics Data System (ADS), SAO, Cambridge, MA
A new pallasite grouplet, the pyroxene pallasites, consisting of the meteorites Vermillion and Y8451, has been identified by petrologic, trace element, and oxygen isotopic data. Vermillion is a new 27 kg find from central Kansas with a texture that differs from main group (MG) and Eagle Station (ES) pallasites and consists of about (vol. %) 86 FeNi metal and 14 silicates. The silicates are interspersed with metal along bands up to 1.5 cm wide within the metal host. These bands contain micron to cm-sized silicates, including rounded to subrounded olivine (up to 1.5 cm), as well as orthopyroxene, chromite, and merrillite. Y8451, previously described in [1], is texturally similar to MG pallasites and consists of FeNi metal, rounded to subangular olivine (up to 1 cm), pyroxene, chromite, and merrillite. Modally, Vermillion silicates consist of (vol. %) about 93 olivine, 5 opx, 1.5 chromite, 0.5 merrillite, while Y8451 silicates consist of about 94 olivine, 4.8 opx, 1.1 cpx, and 0.1 merrillite. Vermillion olivine (Fo(sub)(87.0-88.9)) is comparable to MG pallasite olivine [2], while that of Y8451 (Fo(sub)(88.8-89.8)) is slightly more magnesian than MG [1]. Vermillion pyroxene (En(sub)(86-88.5) Wo(sub)(0.5-2.5)) typically occurs along the rims of smaller olivine grains, although larger pyroxene inclusions (up to 1 mm) of the same composition are sometimes found within olivine grains. Y8451 has two types of opx, a lower-Ca opx (En(sub)(89.1)
Select Records
Print Reference
Order by ...
Ref-Code
Locate ...
1st Author
|<
<<
<
>
>>
>|
Close

Lower Window controls

Order by... popup
Choose a condition from this popup to sort the literature references database in the specific order. The selected order is active when moving forward or backward in the database by using the control buttons from the Action Bar.

Locate popup
You can quickly locate a specific author, journal, title, volume, number,... Choose the Locate popup and select a field from the list. The edit text box to the right is activated (indicated by yellow background color) where you can enter the expression you wish to locate. Press **<Enter>** to locate the record in the database. The database is automatically ordered by the selected field.

Action Bar
Use the **Action Bar** controls to move forward or backward in the database. For skipping through the database it doesn't matter which of the filing-card page is temorarily activated (topmost). This setting is not changed and only this portion of information is displayed as long as no other of the three pages is selected. See description of individual control buttons in Chapter 3, "Action Bar". Press **<Exit>** to return to the previous window.

<Print Reference>
To print out the detailed record of the selected, displayed literature reference, press this button to open the Print Record Dialog. For details, see under Chapter 3, "Print Record".

<Select Records>
Choosing this button will open the **Record Selection Dialog**, where you can extract specific references from the literature database. For more information on using this dialog, see Chapter 8, "Extracting Meteorite Data."

Journals Overview

More than 2,000 different journals, conference proceedings and abstract volumes as the source of articles or abstracts on meteoritics and planetary sciences are presently indexed in MetBase. A list of these sources can be opened by pressing the **<Journal Overview>** button from the **Main Menu** Page of MetBase. The following table columns can be distinguished:

1. the abbreviated *journal code* (used in the compressed literature print form, accessible from the query/report window)

2. the *detailed journal information* as given in the **Reference Information** page

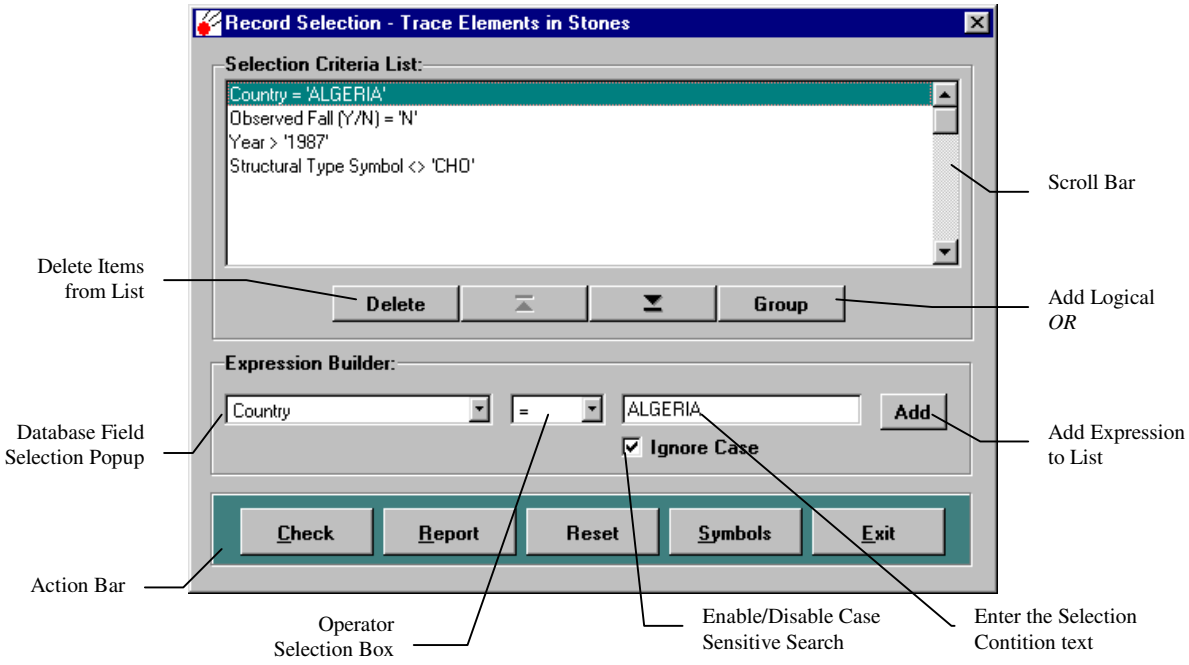
3. the journal *publisher* and *place* of publication

4. the *ISSN*

5. for each journal, the *total count* of literature reference records retrievable from the database

Chapter 8: Extracting Meteorite or Literature Data

One of the most important features of *MetBase* is the **Record Selection Dialog** that will appear when you press the **<Basic Data Extraction>**, **<Repository Overview>**, one of the **Analysis Data** or **Statistics** items of the *MetBase* Main Menu, if you choose the **<Select Meteorites>** button from the **Meteorite Basic Information** or the **Collection Information** dialog window, or the **<Select Records>** button from the **Literature Information** window.



You can easily create a list of selection criteria with the **Expression Builder** that will define your query, the kind and amount of information that is extracted from the database.

An expression that will retrieve the information from the database can look as simple as this:

country = 'Algeria'

All those records in *MetBase* will be extracted that fulfil this condition (data of meteorites found in Algeria).

Building a query expression

1. Choose the **database field popup** control from the **Expression Builder box** and select an item from the list (e.g., “Country”).

2. Move further to the next box, and select an **operator type** (=, < =, < >, > =, = =, LIKE, NOT LIKE, IN) from the popup. Choose “=“ (the default)

3. Move to the **edit text box** and type the **selection condition** (e.g. "France").

4. Push the **<Add>** button to save the generated expression to the **Selection Criteria List**.

You can build further expressions and add them to the Selection Criteria List by repeating step 1 to 4. Each condition you create is combined with the existing conditions in the list using the logical **AND** operator. For a record to be included in the query results, it must meet all the conditions you specify.

You can also combine two conditions by a logical **OR** (e.g., to select all meteorites found in France or in Spain). For this, you must push the **<Group>** button after you have added the first condition (country = "France") to the Criteria List. A double line appears below the condition. Now add the second condition (country = "Spain"). This example simply demonstrates that it is not possible to find any record without grouping the conditions as there is no meteorite that was found in two countries, in France and in Spain. In all cases, where you place the same database field more than one time in the expression criteria list using the "LIKE", "=", or "= =" operator, you have to group it (separate the same fields by the double-line).

5. Run the query by pressing the **<Check>** or the **<Report>** button. Pressing the **<Check>** button let *MetBase* generate a table of the query results that is displayed in the browse window. Pressing the **<Report>** button will open the **Report Dialog Window** where you can order the extracted records, export selected data and select report forms (lists, tables) for printing (see Chapter 9).

When you perform a query, a **status bar** appears in the middle of the screen that keeps you posted about the progress of the record extraction. When the query is complete, *MetBase* displays the number of records selected.

In the following pages a description of the individual window objects and controls is given.

Expression Builder box

Database Field Name popup control

Select a database field name that contains the kind of information you want to extract in the query. For example, the database field "Country" contains the names of the countries in which the meteorites were found.

An explanation of the various database field contents is given in the table of Chapter 12.

Relational Operator popup control

Operator	Operation
=	Equal to
= =	Character string comparison ("exactly like")
<	Less than
>	More than
< =	Less than or equal to
> =	More than or equal to
< >	Not equal to ("excluding")
IN	List of strings to be found in a single database field
LIKE	Equal to (find string in text of variable length)
NOT LIKE	Not equal to (string not to be found in text of variable length)

Comments:
When you use "**=**", the content of the database field must **start** with the characters that you type in the edit text box in order to be selected (e.g., classification/subtype = "L6" will select all L6 chondrites but no LL6 chondrites, as the "6" is not the second character of those fields containing "LL6").

The condition: classification/subtype **=** “L” will extract L and LL chondrites of all petrologic types, whereas classification/subtype **= =** “L” will only extract all L chondrites of unknown petrologic type.

Use “**IN**” if you want to do a query with a selection of different criteria from a single field, for example, Meteorite Name **IN** “Allende”,”Murchison”,”Ornans”. This is simpler than using the grouping utility (e.g., Meteorite Name = “Allende” **OR** Meteorite Name = “Murchison” **OR**...)

Use "**LIKE**" to find a string in a text (e.g. Description & References **LIKE** “B.Mason” will extract all records that have the name “B.Mason” mentioned in the text of field “Description & Reference”).

Edit Text Box
Type the character string or numeric value you wish to retrieve in this text box. Consider lower and upper case letters, since the comparison of the expression with the database field content is case sensitive. Press the **<Enter>** or **<Tab>** key to exit the edit text box.

<Add>
Press the **<Add>** button after you have entered a string or value in the Edit Text Box. The expression is then displayed in the **Selection Criteria Box**. The **<Add>** button is disabled as long as the Edit Text Box is empty.

<Ignore Case>
Unmark the **<Ignore Case>** check box if you wish to do a **case sensitive search** for the **character string** entered in the edit text box. You have to check this box before adding the expression to the Selection Criteria Box. If the **<Ignore Case>** box is crossed (default setting), the character string is displayed in **capital letters** in the Selection Criteria Box after pressing the **<Add>** button.

Action bar

<Check>
The query is performed and the extracted records will be displayed in the **browse window**. If you further wish to format, sort or print the result, you have to press the **<Report>** button in order to proceed to the **Report Dialog Window**. If the Selection Criteria List is empty, all records in the database are selected, except for two cases where you have to define a condition because of the too large amount of data in the database.

<Report>
Pressing this button will bring you directly to the **Report Dialog Window** after the query is done and records are found. See Chapter 9, “Reporting Query Results”.

<Reset>
By pressing the **<Reset>** button, the content in the **Selection Criteria List** is deleted and the Selection Dialog is resetted to its starting condition

<Symbols>
A table is displayed which contains symbols and country names that can be used in *MetBase* to retrieve data. The symbols are ordered according to the fields in the database that contain these symbols. This shall help you to use the right style when entering text into the **Edit Text Box** of the **Expression Builder**, especially in case of classifications. The column “Fieldname” shows the name of the database field that contains the specific symbol. The column “Cnt” displays the number of records in *MetBase* that contain the specific symbol. The column “Description” displays the meaning of the symbol.

<Exit>
Return to the previous window

Selection Criteria Box

The Selection Criteria Box displays the list of query conditions copied from the Expression Builder. You can delete, edit and move individual expressions in the list. Therefore, **Tab** into the Selection Criteria Box and move to a specific expression by using the **<Up>** or **<Down>** arrow keys or click the mouse on the specific expression to highlight it. The control buttons as described below become activated. Press the **<Enter>** key or double click with the mouse to reposition the expression in the Expression Builder Box for editing. After editing, you can again save the expression to the Selection Criteria Box by pressing the **<Add>** button. The highlighted line in the Selection Criteria Box will be overwritten with the new expression.

<Delete>
Deletes a single condition or a double line from the list. You have to select (highlight) the condition you want to delete before. Click on the condition with the mouse or move to it using the **<Tab>** and the **<Up>** or **<Down>** arrow keys. Then push the **<Delete>** button to remove the selected line from the list.

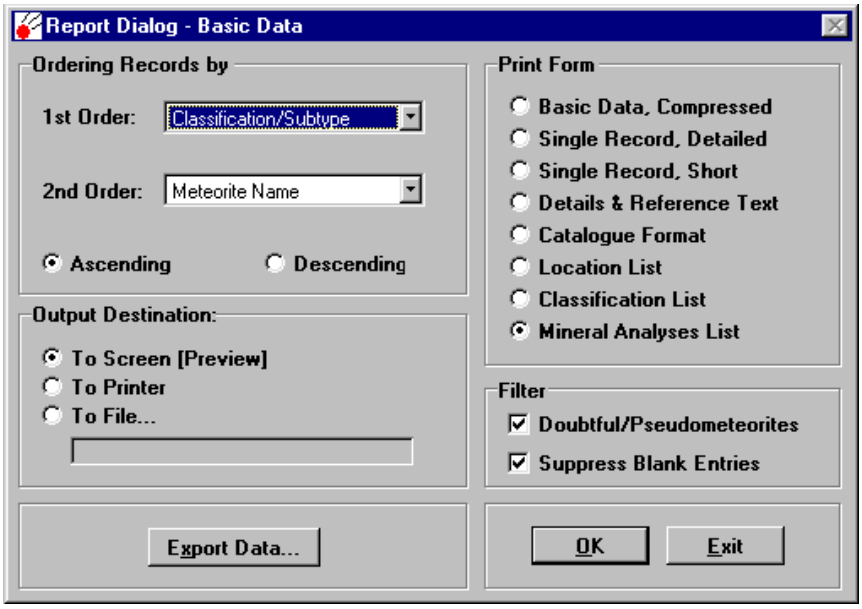
< ↑ >
Pressing this button will scroll the selected condition one line upwards in the list. This is useful if you want to group conditions after you have placed them in the Selection Criteria List.

< ↓ >
This will move the selected condition one line downwards in the Selection Criteria List.

<Group>
Pressing this button will place a double-line above the condition you have selected in the list. This will combine the conditions before and after the line by a logical OR. You can place more than one group in your list (up to 50 lines). If you have not selected a condition before, the double-line will be appended to the list.

Chapter 9: Reporting query results

When you choose the **<Report>** button from the **Action Bar**, the query is performed and the **Report Dialog Window** appears.



In this window you can further **format** the extracted data. You can specify the order you want the data to be presented and choose a print form. You have the choice to direct the data to the screen (as preview), to the printer, or to a file (for later printing). From this window you can directly export data in different file formats.

The kinds of options that are accessible in a Report Dialog Window depend upon the Record Selection Dialog you have used before. There are three different Report Dialog Windows available, for basic meteorite data, for collection information, and for analysis data or statistics.

Description of individual window objects:

Ordering Records by...
Here, you can specify the order you want the data presented. In most cases, you can choose two different database fields as the ordering criteria.

1st Order popup
Choose a database field from the first order popup. The records are ordered by the selected field first.

2nd Order popup
Choose another database field from this popup if you want a secondary ordering criterion on your records. The popup is disabled as long as you have not selected a first order criterion from the 1st Order popup.

( ) Ascending
( ) Descending
The records are by default organized in ascending order. Choose the Descending radio button if you want the data to be reported in descending order.

Print Form

Choose a print form from the list. Every print form in *MetBase* has a fixed format in which the query results are printed. In most cases, the number of available database fields with the extracted information does not fit as a table on a single page. And commonly, you do not wish to print all available information. The list gives you a choice of print forms that display the data in either a tabular form with one row for each record and the database fields as columns, or in a catalogue form with more than one row for a single record. The print forms contain a header that shows the name of the print form, the ordering criteria, and the selection criteria defined in the query. The selection criteria expression contains the internal field names (up to 10 characters) of the database tables as used within the program.

When you open the Report Dialog from the **Basic Data Extraction** or **Mineral Analysis** option of the Main Menu Page, or from the **<Select Meteorites>** option of the Detailed Meteorite Information Dialog, following print forms can be chosen:

Basic Data, Compressed
This form prints the important basic meteorite data in a table, including columns for meteorite name, country, date of fall/find, classification symbol, total known weight, latitude and longitude of find location. If the meteorite was observed to fall, this is indicated by an asterisk (*), printed in front of the meteorite name.

Single Record, Detailed
This is the same print form which is automatically used when you print the data of the displayed meteorite in the **Detailed Meteorite Information Dialog** (i.e., choosing the **<Print Record>** button). It contains the complete information on every selected meteorite, with find location, total known weight, number of pieces, classification data, mineral analysis, pairings, synonyms, find/fall circumstances, literature references, and repositories of material and prepared section. At least **one full page for each meteorite** is printed, so be careful with using this form, especially when you retrieved a larger number of records in the query.

Single Record, Short
This form just prints the first part of the Single Record, Detailed print form, excluding the find/fall circumstances, literature references and repository information. Even with this form, the volume of printed paper can get quite large if many records were selected.

Details & Reference Text
This form only prints the details & references text (literature references, find/fall circumstances and analyses details) for the selected meteorites. Information on reposities and basic data are excluded.

Catalogue Format
This print form includes the important basic meteorite data, i.e., name, location with coordinates, date of fall/find, classification, and total known weight. Each meteorite record is arranged in a box, using up at least 5 lines of the printed page.

Location List
This form is printed in a tabular format, which displays the meteorite location details, i.e., meteorite name, country, state, district, latitude and longitude. If the meteorite was observed to fall, this is indicated by an asterisk (*), printed in front of the meteorite name.

Classification List
This form is printed in a tabular format, which displays details on classification, i.e., meteorite name, country, classification symbols (material symbol, structural type symbol, classification/subtype symbol), shock classification, weathering category, and mineralogical or petrological remarks. Upon selection of this print form, the <Suppress Blank Entries> button is activated, where you can exclude blank lines (usually the doubtful cases and pseudometeorites) from being printed. If the meteorite was observed to fall, this is indicated by an asterisk (*), printed in front of the meteorite name.

Mineral Analyses List
This form is printed in a tabular format, which displays details on mineral analysis, i.e., meteorite name, classification, olivine Fa (mean, stddev., range), pyroxene Fs (mean, stddev., range), and total iron content. Upon selection of this print form, the <Suppress Blank Entries> button is activated, where you can exclude blank lines (usually the doubtful cases and pseudometeorites) from being printed. If the meteorite was observed to fall, this is indicated by an asterisk (*), printed in front of the meteorite name.

Filter
In the Report Dialog Window for Basic Meteorite Data, you find two check boxes for filtering unwanted records from being included in the print form.

Doubtful/Pseudometeorites
Check this box if you want to exclude all Pseudometeorites and doubtful cases from being printed.

Suppress Blank Entries
In some print forms (e.g., Mineral Analysis List) it happens that no data are available for a whole record. You can check this box if you want to exclude these rows from your print form.

Output Destination

Select **<To Screen>** to **preview** the print form before sending it to the printer.

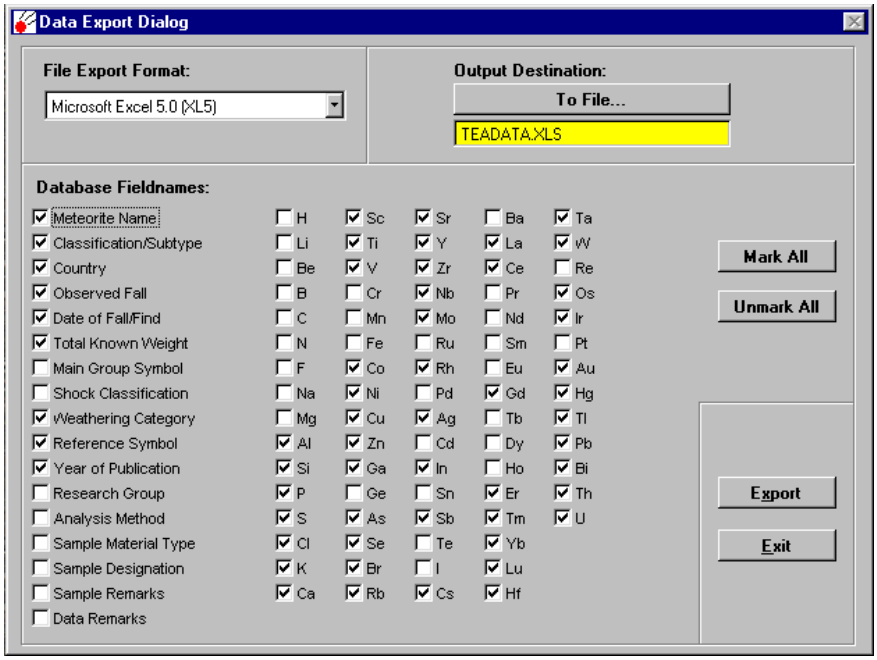
Select **<To Printer>** to send the output directly to your connected printer.

Select **<To File>** if you wish to print the report at a later time, for example if you do not have a printer connected to your PC. All necessary escape sequences for printer control will be added to the report text on file.

<Exporting data...>
Pressing this button displays the **Data Export Window**, see Chapter 10 for more details.

Chapter 10: Exporting Data

This utility gives you the ability to generate a file of the retrieved information that can be read and further processed by a foreign program like *Microsoft Excel* or *Lotus 1-2-3*. Simply mark the database fields you wish to have included in the export file. For example, if you later want to plot geographic meteorite locations on a map, select the decimal latitude and longitude fields from the list of database field names. Choose an export format (e.g., *Microsoft Excel*) from the popup list and specify a file name for the output destination. The generated file automatically gets the .xls extension and can directly be opened in *Microsoft Excel* and plotted as a chart.


Data Export Dialog
File Export Format:
Microsoft Excel 5.0 (XL5)
Output Destination:
To File...
TEADATA.XLS
Database Fieldnames:
Meteorite Name
Classification/Subtype
Country
Observed Fall
Date of Fall/Find
Total Known Weight
Main Group Symbol
Shock Classification
Weathering Category
Reference Symbol
Year of Publication
Research Group
Analysis Method
Sample Material Type
Sample Designation
Sample Remarks
Data Remarks
H Li Be B C N F Na Mg Al Si P S Cl K Ca
Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Rb
Sr Y Zr Nb Mo Ru Rh Pd Ag Cd In Sn Sb Te I Cs
Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf
Ta W Re Os Ir Pt Au Hg Tl Pb Bi Th U
Mark All
Unmark All
Export
Exit

Description of individual window objects:

Export File Formats

Open the popup and choose an export file format from the list. Select the "**Delimited with Tabs**" or "**Delimited with Commas**" formats to generate an ASCII text file, in which the database fields are separated by tabs or by commas, respectively. Since character data may include commas, character fields are additionally delimited with double quotation marks.

The **Database (DBF)** file format can be used by *FoxPro*, *FoxBASE+* and *dBASE IV* database programs. The new file is assigned a .DBF extension by default.

The **System Data Format (SDF)** file is an ASCII file in which records have a fixed length and end with a carriage return and line feed. Fields aren't delimited. The SDF file name assigned a .TXT file extension if you do not include an extension

The **Symbolic Link Format (SYLK)** file is an interchange format (used by *Microsoft MultiPlan*) in which fields from the table in the browse window become columns in the spreadsheet and records become rows. SYLK file names have no extension by default.

The **Data Interchange Format (DIF)** file is used by *VisiCalc* and some other programs. Fields from the browse window table become vectors (columns) and records become tuples (rows). The new file name is assigned a .DIF extension by default.

In the ***Microsoft Excel*** **(XLS)**, (version 2 and 5) file format, each database field becomes a column in the spreadsheet and each record becomes a row in the spreadsheet. A .XLS extension is assigned to the newly created spreadsheet by default

Data can be exported to a file in **Microsoft Multiplan** version 4.01 format. The new file is assigned a .MOD extension by default.

Data can be exported to a file in **Lotus Symphony** version 1.0 **(WRK)** format. Select the Lotus Symphony **(WR1)** format if you use the version 1.1 or 1.2. A .WR1 extension is assigned to the new spreadsheet by default.

Data can be exported to a spreadsheet file in **Lotus 1-2-3** format. Select **(WKS)** format if you use the Lotus 1-2-3 revision 1A. Select **(WK1)** if you use the Lotus 1-2-3 revision 2.x.

Database Fieldname
Each database field that is available in the query result can be selected from the list of check boxes. Check the box left of the database field name that you want to have included in the data export. You can include as many fields as listed but you must check at least one in order to have the **<Export>** button activated.

Mark All / Unmark All
Check the **<Mark All>** button to select all database fields for exporting. Check the **<Unmark All>** button to clear all previously selected database fields for exporting.

Output Destination
Pressing the **<To File...>** button opens the **Save As Dialog Window**. Here you have to enter the filename with the complete path where you wish to have the file copied to. The right extension will be automatically added to the filename, so you do not have to include it. The path and filename are displayed in a box when you return to the Data Export Window.

Save As Dialog Window
The Save As Dialog is opened when you choose the **<To File...>** button from the **Export Data Dialog** or the **Print Record** window. It allows you to define a name for the export or print file. If the file you want to save has already be named, the current name of the file appears in the list box. Only those files are listed here, that have the right extension (the extension that is automatically added to the file name depends on the chosen file format). To display all files in the active directory, check the "**All Files**" box. Double-click or press **<Enter>** key on the highlighted filename in the list to display it in the **edit text box** at the bottom of the window. The file is saved in the **currently active directory**, which is displayed in the **Directory** popup control. You can change the directory and drive letter by selecting them from the **Drive** and **Directory** popups. Choose the **<Save>** button to save the settings or choose **<Cancel>** to exit the Save As Dialog without saving.

Choose **<Export>** button to generate the export file in the specified directory. Press **<Exit>** to leave the window and return to the Report Dialog Window. The **<Export>** button is **disabled** as long as you have not selected a database field and an output destination.

Chapter 11: Query Examples

In the following you will find some query examples that will help you to learn how to use this dialog more efficiently. Just follow the commands, line by line.

a) You wish to view all noble gas data of the CM2 carbonaceous chondrites Bells, Murchison, Murray, and Nogoya

1. Choose the ***<Noble Gas Isotopes>*** option from the Main Menu Page

2. Choose ***Meteorite Name*** from the database field popup of the Expression Builder
3. Choose the ***IN*** operator from the operator popup of the Expression Builder
4. Type ***Bells,Murchison,Murray,Nogoya*** in the edit text box of the Expression Builder
5. Press the ***<Add>*** button to move expression to the selection criteria list

6. Press **<Check>** button to run the query and to view the result in the browse window

b) You wish to retrieve all iron meteorites of group IAB having a nickel content of more than 12 wt.% and an iridium content of less than 1.0 ppm

1. Choose the ***<Trace Element Data>*** option from the Main Menu Page

2. Choose ***Main Group Symbol*** from the database field popup of the Expression Builder
3. Choose the **=** operator from the operator popup of the Expression Builder
4. Type ***IAB*** in the edit text box of the Expression Builder
5. Press the ***<Add>*** button to move expression to the selection criteria list

6. Choose ***Ni Concentration [mg/g]*** from the database field popup of the Expression Builder
7. Choose the **>** operator from the operator popup of the Expression Builder
8. Type ***120*** in the edit text box of the Expression Builder
9. Press the ***<Add>*** button to move expression to the selection criteria list

10. Choose the **<** operator from the operator popup of the Expression Builder
11. Type ***1000*** in the edit text box of the Expression Builder
12. Press the ***<Add>*** button to move expression to the selection criteria list

13. Choose ***Ir Concentration [mg/g]*** from the database field popup of the Expression Builder
14. Choose the **<** operator from the operator popup of the Expression Builder
15. Type ***1.0*** in the edit text box of the Expression Builder
16. Press the ***<Add>*** button to move expression to the selection criteria list

17. Press **<Check>** button to run the query and to view the result in the browse window

c) You wish to retrieve all LL chondrites that were found in the Sahara desert of Algeria and Libya between 1986 and 1993

1. Choose the ***<Basic Data Extraction>*** option from the Main Menu Page

2. Choose ***Country*** from the database field popup of the Expression Builder
3. Choose the ***IN*** operator from the operator popup of the Expression Builder
4. Type ***Algeria,Libya*** in the edit text box of the Expression Builder
5. Press the ***<Add>*** button to move expression to the selection criteria list

6. Choose ***Year*** from the database field popup of the Expression Builder
7. Choose the **>=** operator from the operator popup of the Expression Builder
8. Type ***1986*** in the edit text box of the Expression Builder
9. Press the ***<Add>*** button to move expression to the selection criteria list

10. Choose the **<=** operator from the operator popup of the Expression Builder
11. Type ***1993*** in the edit text box of the Expression Builder
12. Press the ***<Add>*** button to move expression to the selection criteria list

13. Choose ***Observed Fall*** from the database field popup of the Expression Builder
14. Choose the **=** operator from the operator popup of the Expression Builder
15. Type ***1986*** in the edit text box of the Expression Builder
16. Press the ***<Add>*** button to move expression to the selection criteria list

17. Choose ***Main Group Symbol*** from the database field popup of the Expression Builder
18. Choose the **=** operator from the operator popup of the Expression Builder
19. Type ***LL*** in the edit text box of the Expression Builder
20. Press the ***<Add>*** button to move expression to the selection criteria list

21. Press **<Check>** button to run the query and to view the result in the browse window

d) You wish to retrieve the meteorites that are stored in the collection of the Max-Planck-Institute in Mainz, Germany, and that have not yet been classified

1. Choose the ***<Basic Data Extraction>*** option from the Main Menu Page

2. Choose ***Repository, Material*** from the database field popup of the Expression Builder
   The ***LIKE*** operator is automatically selected in the operator popup of the Expression Builder
3. Type ***Mainz, Max-Planck-Inst.*** in the edit text box of the Expression Builder
4. Press the ***<Add>*** button to move expression to the selection criteria list

5. Choose ***Classification/Subtype*** from the database field popup of the Expression Builder
6. Choose the **<** operator from the operator popup of the Expression Builder
7. Type ***0*** in the edit text box of the Expression Builder
8. Press the ***<Add>*** button to move expression to the selection criteria list

9. Press **<Check>** button to run the query and to view the result in the browse window

Note: The database field Classification/Subtypes is left blank for Meteorites that have not been classified yet. Since you cannot enter a blank in the edit text box, just specify ***< 0*** to be sure that all known classification symbols are excluded from the query result (i.e., to have only blank fields retrieved)

e) The curator of the Naturhistorisches Museum in Vienna is planning to trade meteorite specimens with the Musee d'Histoire Naturelle in Paris. For this reason, he wants to know, which of the meteorites in the Paris collection are not represented in the collection of his own museum. He knows that Paris is not willing to trade meteorites with weights of less than 500 grams represented in their collection.

1. Choose the ***<Collection Information>*** option from the Main Menu Page

2. Locate for **coll. code = *Paris, Mus.*** from the Locate box
3. Choose the **<Select Meteorites>** button (the Paris collection catalogue is assembled)

4. Choose ***Repository, Material*** from the database field popup of the Expression Builder
5. Choose the ***NOT LIKE*** operator from the operator popup of the Expression Builder
6. Type ***Vienna, Naturhist. Mus.*** in the edit text box of the Expression Builder
7. Press the ***<Add>*** button to move expression to the selection criteria list

8. Choose ***Weight in Collection (g)*** from the database field popup of the Expression Builder
9. Choose the **>=** operator from the operator popup of the Expression Builder
10. Type ***500*** in the edit text box of the Expression Builder
11. Press the ***<Add>*** button to move expression to the selection criteria list

12. Press **<Check>** button to run the query and to view the result in the browse window

f) You wish to retrieve the mineral analysis data of all unequilibrated chondrites with olivine Fa mean values of less than 13 or pyroxene Fs values of less than 9.

1. Choose the ***<Mineral Analysis>*** option from the Main Menu Page

2. Choose ***olivine Fa mean*** from the database field popup of the Expression Builder
3. Choose the **>** operator from the operator popup of the Expression Builder
4. Type ***0*** in the edit text box of the Expression Builder
5. Press the ***<Add>*** button to move expression to the selection criteria list

6. Choose the **<** operator from the operator popup of the Expression Builder
7. Type ***13*** in the edit text box of the Expression Builder
8. Press the ***<Add>*** button to move expression to the selection criteria list

9. Choose ***Structural Type Symbol*** from the database field popup of the Expression Builder
10. Choose the **=** operator from the operator popup of the Expression Builder
11. Type ***CHU*** in the edit text box of the Expression Builder
12. Press the ***<Add>*** button to move expression to the selection criteria list

13. Press the **<Group>** button (a double line appears in the selection criteria list)

15. Press the ***<Add>*** button to move expression to the selection criteria list

16. Choose ***pyroxene Fs mean*** from the database field popup of the Expression Builder
17. Choose the **>** operator from the operator popup of the Expression Builder
18. Type ***0*** in the edit text box of the Expression Builder
19. Press the ***<Add>*** button to move expression to the selection criteria list

20. Choose the **<** operator from the operator popup of the Expression Builder
21. Type ***9*** in the edit text box of the Expression Builder
22. Press the ***<Add>*** button to move expression to the selection criteria list

23. Press **<Check>** button to run the query and to view the result in the browse window

Note: You have to specify the structural type symbol = CHU two times, before and after the group double line, in order to select the olivine and pyroxene data only for uneqilibrated chondrites in both cases. You have to specify the condition > 0 if you want to exclude blank fields (i.e., records without analysis data reported)

g) You wish to retrieve all records with noble gas data published after 1990 that contain the author name "Schultz,L." in the cited reference

1. Choose the ***<Noble Gas Isotopes>*** option from the Main Menu Page

2. Choose ***Reference Text, Detailed*** from the database field popup of the Expression Builder
   The ***LIKE*** operator is automatically selected in the operator popup of the Expression Builder
3. Type ***Schultz,L.*** in the edit text box of the Expression Builder
4. Press the ***<Add>*** button to move expression to the selection criteria list

5. Type ***199*** in the edit text box of the Expression Builder
6. Press the ***<Add>*** button to move expression to the selection criteria list

7. Press **<Check>** button to run the query and to view the result in the browse window

Note: Use the Reference Text, Detailed database field to have co-author names included in the query

h) You wish to have a statistical calculation for Antarctic meteorites, including the number of classificational groups and the total weight sum of all members in each group.

1. Choose the ***<Classifications/Subtypes>*** option from the statistics box of the Main Menu Page

2. Choose ***Country*** from the database field popup of the Expression Builder
3. Choose the **=** operator from the operator popup of the Expression Builder
4. Type ***Antarctica*** in the edit text box of the Expression Builder
5. Press the ***<Add>*** button to move expression to the selection criteria list

6. Press **<Check>** button to run the query and to view the result in the browse window

Chapter 12: Description of Database Fields

In this Chapter you will find a table with helpful information about the various database fields that can be used for retrieving and ordering of records. The database fields as named in the Expression Builder popups, the menu option number as given in the Main Menu Page, the Operators that are recommended to be preferrably chosen when doing a query, and the description of the database formats and contents of each field, are listed in the table columns.

Menu option, option name and name of the used dialog

Menu Option	Option Name	Dialog Name
a	Meteorite Information	Detailed Meteorite Information
b	Basic Data Extraction	Query - Basic Meteorite Data Extraction
c	Collection Information	Meteorite Collection Information
d	Repository Overview	Query - Meteorite Repository Overview
e	Mineral Chemistry	Query - Mineral Analysis & Classifications
f	Bulk Chemical Analyses	Query - Bulk Chemical Analysis Data
g	Trace Elements in Stones	Query - Major and Trace Element Analysis Data on Stones/Stony Irons (of bulk or silicate phase only)
h	Trace Elements in Irons	Query - Trace Element Analysis Data on Irons and Stony Irons (of metal phase only)
i	Noble Gas Isotopes	Query - Noble Gas Analysis Data
j	Cosmogenic Nuclides	Query - Cosmogenic Radionuclide Data
k	Light Stable Isotopes	Query - Light Stable Isotope Data (O, N, C, H)
l	Thermoluminescence Data	Query – Natural and Induced TL data
v	Physical Properties	Query – Density and Porosity Data
m	Main Group Classification	Query - Statistics on Main Group Classifications
n	Classification/Subtype	Query - Statistics on Classifications/Subtypes
o	Shock Classifications	Query - Statistics on Shock Classifications
p	Annual Falls/Finds	Query - Annual Fall/Find Statistics
u	Country Statistics	Query - Country Statistics
r	Bibliography	Meteorite Literature Survey

Description of individual database fields used in the Record Selection Dialogs

Database Field Name	Used in Dialogs (Menu Option)	Recommended Operator Usage	Description, the Field Contains:	Examples (Range)
% of Total Count	Annual Falls/Finds		the percentage of selected to total number of meteorites found in a specific year. This field is temporarly created during the query and can be used for ordering of records.	(0 - 100)
% of Total Weight	Annual Falls/Finds		The percentage of selected to total weight of all meteorites found in a specific year. This field is temporarly created during the query and can be used for ordering of records.	(0 - 100)
Age Remarks	Cosmogenic Nuclides	=, LIKE	remarks to the given terrestrial age values and an indication on which radionuclides they are based on (e.g., C-14 terrestrial age)	36Cl terr. age
Analysis Method	Bulk Chemical Analyses Trace Elements/Stones Trace Elements/Irons Cosmogenic Nuclides Physical Properties	=, IN	an acronym for the employed analysis method (e.g., INAA, RNAA, XRF, EMPA, W, GRC...)	INAA
Analysis Remarks	Meteorite Information Basic Data Extraction Mineral Chemistry	LIKE	a text field of variable length as displayed in Mineral Analyses Window. Often contains plagioclase, ortho- and clinopyroxene, kamacite composition.	An11 spinel
Analysis Remarks	Bulk Chemical Analyses Cosmogenic Nuclides Light Stable Isotopes TL Data Physical Properties	=, IN, LIKE	remarks to analysis data, for bulk chemical analyses further components not included in the fixed component fields (e.g., NiO, S, SO_3),	NiO AMS
Analyst	Bulk Chemical Analyses	=, IN	the name of the person who performed the analysis	Jarosewich E.
Authenticity Remark	All Dialogs*	=, IN	a single letter (D = doubtful case, P = pseudometeorite). In case of an antarctic meteorite the letter indicates the expedition team (A = ANSMET, E = EUROMET, J = JARE, N = New Zealand, C = Joined ANSMET (U.S.A.). - JARE (Japan) Expedition team	A
Authors	Literature Retrieval	=, IN	the name of the first author and all coauthors (if present) of a publication. Syntax: First names are abbreviated to single letters followed by a dot and positioned befind the family name. Individual authors are separated by a comma. Family name and first name letters/dots are separated by blanks. In few cases „et al.“ is given if coauthor names are unknown	Wasson J. T., Scott E. R. D.
Average Group Weight	Main Group Classification Classification/Subtype		the average total weight in kg, calculated from the individual total weights in a group. This field is available for ordering of reports, only.	(>0.0001)
Bib-Code	Literature Survey	=, LIKE, IN, <, ≤, >, ≥	the ID code or reference number of the bibliographic source of the reference is given	1998M&PS
Brecciation (Y/N)	All Dialogs*	=	whether the meteorite is brecciated or unbrecciated. Y indicates that the meteorite is a known breccia. N indicates that the meteorite is obviously unbrecciated. N will usually not applied to ordinary chondrites. All howardites and polymict eucrites, ureilites and diogenites are	Y

			indicated with Y.	
Carbon Yield (ppm)	Light Stable Isotopes	<, ≤, >, ≥	the total amount of carbon in µg/g released during the measurement (usually done by stepped combustion heating)	(>100)
Category	Literature Survey	=, ==, IN	the main topic of the publication (e.g., meteorites (incl. origin of the solar system, cosmochemistry), meteors/meteoroids, tektites, impact cratering, lunar geology, interplanetary dust (IDPs), comets, Mars, Venus, Mercury, asteroids, general planetology, planet earth	impact cratering
Chemical Component Concentration (wt.%)	Bulk Chemical Analyses	<, ≤, >, ≥	the concentration value (in percent weight) of the analyzed chemical component (*SiO_2, TiO_2, Al_2O_3, Cr_2O_3, Fe_2O_3, FeO, MnO, MgO, Na_2O, K_2O, P_2O_5, H_2O^+, H_2O^-, Fe_m, Nickel, Cobalt, FeS, Carbon*)	(0.00-99.99)
City of Repository	Repository Overview	=, IN	the name of the city in which the collection or repository is situated	Hamburg
Classification/Subtype	All Dialogs*	=, ==, IN	the classification including all subtype numbers and anomal designations (e.g., L3.6, IIIE-AN, AEUC-P). All available classifications can be displayed in the Symbols browse window	CK4-AN MES-A1
Classification Remarks	All Dialogs*	LIKE	mineralogical, structural / textural notes (e.g., “regolith breccia”, “shocked”, “veined”, “clast rich”, “dark”, “gas rich”, etc.). In case of pallasites also the shape of olivines (e.g., “rounded“). In case of irons also the presence of silicates (e.g.,“with silicate inclusions“) and other features (e.g., “annealed“)	shock veins
Collection # (Ranking)	Repository Overview	<, ≤, >, ≥	the number gives the ranking of every collection in MetBase. The ranking is based on the total number of meteorites the collection contains, independent of size and quality	(1-650)
Collection Code	Repository Overview	=, LIKE	the collection code or abbreviation as used in the Repository Information Window of the Detailed Meteorite Information Dialog	Oxford, Univ. Mus.
Cosmogenic Nuclide Activity (dpm/kg)	Cosmogenic Nuclides	<, ≤, >, ≥	the activity value of the analyzed radionuclide as published in the cited reference (*^{10}Be, ^{14}C, ^{26}Al, ^{36}Cl, ^{41}Ca, ^{53}Mn*)	(>0.0001)
Count	Main Group Classification Classification/Subtype		the number of individual meteorites in the group. This field is available for ordering of reports, only	(≥0)
Count, Achondrites	Country Statistics		the number of achondrites in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Count, Falls	Country Statistics		the number of observed falls in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Count, Finds	Country Statistics		the number of finds in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Count, Irons	Country Statistics		the number of irons in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Count, Ordinary Chondrites	Country Statistics		the number of ordinary chondrites in the statistical calculation. This field is available for ordering of reports, only	(≥0)

Count, Stones	Country Statistics		the number of stony meteorites in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Count, Stony-irons	Country Statistics		the number of iron meteorites in the statistical calculation. This field is available for ordering of reports, only	(≥0)
Country	All Dialogs*	=, IN	the current name of the country in which the meteorite was discovered. The list of available countries can be displayed in the Symbols browse window	USA Japan
Country of Repository	Repository Overview	=, IN	the name of the country in which the collection or repository is situated	Germany
d O-18 (% rel. SMOW)	Light Stable Isotopes	<, ≤, >, ≥	the $\delta^{18}O$ value relative to SMOW (= $^{18}O/^{16}O$ ratio)	(<-2.0)
d O-17 (% rel. SMOW)	Light Stable Isotopes	<, ≤, >, ≥	the $\delta^{17}O$ value relative to SMOW (= $^{17}O/^{16}O$ ratio)	(<-2.0)
delta O-17 (%rel.SMOW)	Light Stable Isotopes	<, ≤, >, ≥	the $\Delta^{17}O$ composition (=$\delta^{17}O$ - 0.52 * $\delta^{18}O$ indicating the departure from the terrestrial fractionation line) in permil (%.) deviations from the SMOW (Standard Mean Ocean Water)	(>4.0)
d C-13 (% rel. PDB)	Light Stable Isotopes	<, ≤, >, ≥	the $\delta^{13}C$ (=$^{13}C/^{12}C$ ratio) in permil (%.) relative to the PDB standard (PDB = Pee Dee belemnite fossile carbonate from the Cretaceous Pee Dee formation in South Carolina)	(<-2.0)
d N-15 (% rel. air)	Light Stable Isotopes	<, ≤, >, ≥	the $\delta^{15}N$ composition (=$^{15}N/^{14}N$ ratio) in permil (%.) relative to the air standard	(<-2.0)
d D (% rel. SMOW)	Light Stable Isotopes	<, ≤, >, ≥	the δ D/H ratio in permil (%.) relative to SMOW	(<-2.0)
Data Remarks	Trace Elements/Stones	LIKE	remarks to analysis data, e.g. the indication by '<' if the given value is the detection limit of the employed analysis method	Sb<, U<
Date of Find (YYYY/MM/DD)	All Dialogs*	=, <, ≤, >, ≥	the date of meteorite fall or find. Format: Year/Month/Day (e.g., "1990/07/08"). Positions for month and day are left blank if this information is unknown (e.g, "1990" or "1990/07")	1803/04/26
Day (01...31)	All Dialogs*	=, IN	the day of meteorite fall or recovery	(01-31)
Description & References	All Dialogs*	LIKE	a text field of variable length. Contains information as displayed in the Details & References window of the Detailed Meteorite Record Dialog (e.g, find/fall circumstances, references, literature). The content of this field can be retrieved from the Detailed Meteorite Record Dialog or by choosing the "Single Record, Detailed" print form from the Report Dialog.	oxygen isotop SiC grain Nizhiizumi
District	All Dialogs*	=, IN	the name of district or county in which the meteorite was located	Roosevelt Co.
Editorial	Literature Survey	=	Yes is given if the publication is done under editorship	Yes
Element Concentration [mg/g], [µg/g], or [ng/g]	Trace Elements/Stones Trace Elements/Irons	<, ≤, >, ≥	the concentration of the specific element (B, Na, Ni, Co, Ga, Ge, Ir, As, W...) in milligram per gram, microgram per gram, or nanogram per gram. The decimal number, if zero, does not indicate the precision of the measurement	(>0.001)
Element Concentration	Trace Elements/Stones	<, ≤, >, ≥	the ratio of two specific element abundance values	(>0.001)

Ratios	Trace Elements/Irons			
Group Weight Sum	Main Group Classification Classification/Subtype		the weight sum of the total known weights of all individual group members. This field is available for ordering of reports, only	(≥0.0001)
Hydrogen Yield (ppm)	Light Stable Isotopes	<, ≤, >, ≥	the total amount of hydrogen in µg/g released during the measurement (usually done by stepped combustion heating)	(>100)
ISSN	Literature Survey	=	the ISSN of a journal is given	0016-7037
ITL Normalization	TL Data	=	the standard used for induced TL sensitivity normalization (D = Dhajala normally used for unequilibrated chondrites, K = Kernouve often used for equilibrated chondrites)	D K
ITL Sensitivity	TL Data	<, ≤, >, ≥	the induced TL sensitivity normalized to a known standard (Dhajala or Kernouve) of a sample previously exposed to a 250 mCi ^{90}Sr beta source	(>10)
ITL Temperature (°C)	TL Data	<, ≤, >, ≥	the temperature where the induced TL maximum occurs (peak temperature)	(>200)
ITL FWHM (°C)	TL Data	<, ≤, >, ≥	the FWHM (full-width-at-half-mean) value of the highest peak in the induced TL glow curve.	(>10)
Grain Density (g/cm³)	Physical Properties	<, ≤, >, ≥	the grain density of the analyzed sample, which is the density excluding pores.	(>3.5)
Bulk Density (g/cm³)	Physical Properties	<, ≤, >, ≥	the bulk density of the analyzed sample, which is the density including pores..	(>3.2)
Measured Porosity (%)	Physical Properties	<, ≤, >, ≥	the porosity of the sample as measured	(>9)
Model Porosity (%)	Physical Properties	<, ≤, >, ≥	the estimated porosity of the sample based on the composition of meteorite or meteorite type	(>7.5)
Average Porosity (%)	Physical Properties	<, ≤, >, ≥	the porosity calculated from the difference between average grain and average bulk density.	(>8)
Sample Weight (g)	Physical Properties	<, ≤, >, ≥	the mass of the measured sample.	(>1)
Journal	Literature Survey	=, LIKE, IN	the name of the journal or conference volume (starting with *In:*) in which the abstract or article has been published (e.g., Meteoritics, Geochimica et Cosmochimica Acta, Earth and Planetary Science Letter)	Meteoritics
Kamacite Bandwidth (mm)	Trace Element Data	<, ≤, >, ≥	the average bandwidth in millimeters of the kamacite phase in iron and stony-iron meteorites	1.2
Keywords	Literature Survey	LIKE	Important keywords describing the content of a specific publication is given. Keywords are stored in upper case letters only and are separated by comma	CARBON-14
Language	Literature Survey	=, IN	the language of the original publication text (e.g., English, French, Spanish, German, Russian, Latin, Italian, Chinese, Japanese, Polish, Swedish, Dutch, Portuguese, and approx. 15 others)	Latin
Latitude	Meteorite Information Basic Data Extraction		the geographical latitude of the meteorite find location. Only available in Data Export Dialog	76°17'27"S

Latitude (decimal)	All Dialogs*	<, ≤, >, ≥	the geographical latitude of the meteorite find location in numeric type with 8 decimal places (e.g., 45.12639). If the latitude is South, a negative value is given	-76.29083333
Longitude	Meteorite Information Basic Data Extraction		the geographical longitude of the meteorite find location. Only available in Data Export Dialog	157°16'0"E
Longitude (decimal)	All Dialogs*	<, ≤, >, ≥	the geographical longitude of the meteorite find location in numeric type with 8 decimal places (e.g., -102.25833333). If the longitude is West, a negative value is given	157.26666667
Main Group Symbol	All Dialogs*	=, ==, IN	a symbol that indicates the chemical group and genetic relationship (parent body) of the meteorite. For the ordinary chondrites, it is the character letter without the petrologic type number (e.g., "L" for "L3", "L4",...). The acronym "HED" is used for howardite/eucrite/diogenite group, "PAC" is used for primitive achondrites (lodranites, acapulcoites, brachinites, winonaites), "SNC" is used for shergottite/nakhlite/chassignite group. Available main group symbols are listed in the Symbols browse window	PAC L IAB
Material (ST/SI/IR)	All Dialogs*	=	the type of material (a rough distinction of meteorites) in a pair of letters (ST = stone, SI = stony-iron, IR = iron). The number of available material types are listed in the Symbols browse window	SI
Maximum Group Weight	Main Group Classification Classification/Subtype		the total weight of the heaviest individual meteorite in the group. This field is available for ordering of reports, only	(>0.0001)
Bib-Code	Literature Survey	=, LIKE, IN, <, ≤, >, ≥	the ID code or reference number of the bibliographic source of the reference is given	1998M&PS
MB Library	Literature Survey	=	„Yes" is given if the specific literature reference is present in the MetBase Library, Fischerhude, Germany (as original or xerox copy)	Yes/No
MetCat-Link	Literature Survey	=	„Yes" is given if the specific literature reference is also cited in the „Details & References" text box of the „Meteorite Information" window.	Yes/No
Meteorite Name (incl. Pairings)	Bulk Chemical Analyses Trace Elements/Stones Trace Elements/Irons Cosmogenic Nuclides Noble Gas Isototpes Light Stable Isotopes TL Data Physical Properties	=, IN	the name of the meteorite. All Pairings of the specified meteorite are also retrieved in the query if analysis data are existing under their pairing names	North Chile
mg [100Mg/(Mg+Fe)]	Trace Elements/Stones	<, ≤, >, ≥	the Mg weight concentration relative to the Mg + Fe weight concentration sum.	(≥0.2)
Minimum Group Weight	Main Group Classification Classification/Subtype		the total weight of the lightest individual meteorite in the group is given. This field is available for ordering of reports, only	(≥0.0001)
Month (April)	All Dialogs*	=, IN	the month in which the meteorite was recovered	April
Nitrogen Yield (ppm)	Light Stable Isotopes	<, ≤, >, ≥	the total amount of nitrogen in µg/g released during the measurement (usually done by stepped	(>100)

			combustion heating)	
Noble Gas Isotope (x10E-8 cc STP/g)	Noble Gas Isotopes	<, ≤, >, ≥	the concentration of the specific noble gas isotope (^{3}He, ^{21}Ne, ^{40}Ar,...) measured in the analyzed sample. The decimal number, if zero, does not indicate the precision of the measurement	(≥0.001)
Noble Gas Isotope Ratio	Noble Gas Isotopes	<, ≤, >, ≥	the ratio calculated from a specific pair of noble gas isotopes (^{4}He/^{3}He, ^{20}Ne/^{22}Ne,...). The given ratios are not corrected	(>0.001)
NTL Level (krad/250°C)	TL Data	<, ≤, >, ≥	the natural TL intensity level in krad of light emmitted from the sample at a temperature of 250°C	(>10)
Number	Literature Survey	=, <, ≤, >, ≥	the journal number (distinct from volume number)	(≥1)
Number of Meteorites	Repository Overview	<, ≤, >, ≥	the total number of individual meteorites in a collection	(≥1)
Number of Pieces	All Dialogs*	=, <, ≤, >, ≥	the number of individuals or fragments found of a single meteorite fall	(≥1)
Objects	Literature Survey	LIKE	the name or number of the objects described, studied or analyzed in the original publication is given if known (e.g., meteorite names, lunar rock sample ID, crater name)	12031, Ries crater, Allende
Observed Fall (Y/N)	All Dialogs*	=	the letter "Y" if the meteorite was an observed fall or "N" if the meteorite was a find (date of fall unknown / not documented)	Y
Olivine Fa mean	All Dialogs*	<, ≤, >, ≥	the olivine fayalite arithmetic mean value of a number of individual measurements or a single value if just one value is reported. The value is given in mole %	(0.1-99.9)
Olivine Fa range	All Dialogs*	<, ≤, >, ≥	the range of olivine fayalite [mole %] with the lowest and highest values obtained in the measurement.	(0.1-99.9)
Olivine Fa stddev.	All Dialogs*	<, ≤, >, ≥	the statistical standard deviation (±1σ) of the olivine fayalite values	(>0.01)
Others (wt.%)	Bulk Chemical Analyses	<, ≤, >, ≥	the total concentration (in percent weight) of chemical components, not included in the fixed fields. For details of these components, see database field "Analysis Remarks"	(>0.01)
Pages	Literature Survey	=, <, ≤, >, ≥	the page number.For articles and abstracts, the first and last page is mostly given. In case of books, catalogs, special publications, the total number is usually given (e.g., 310 pp.)	281-285 110 pp.
Pairings	All Dialogs excluding Analyses Data Queries	LIKE	text of variable length. The names of all known pairings of the specific meteorite are given. For more information on field contents, see under "Pairings" in Chapter 3	Acfer 059
Publication Place	Literature Survey	=, LIKE	the place of publication of a journal, book, catalog, etc.	Lawrence
Publication Type	Literature Survey	=, IN	the type of publication (e.g., article, abstract, book, catalogue, conference volume, special print, dissertation, letter/note, newspaper column, pamphlet, map, picture, juvenile literature, chapter in book, chronicle, editorial, comment/reply, book review, bibliography)	article
Publisher	Literature Survey	=, LIKE	the name of the the publisher of a journal, book, catalog, etc.	The Meteoritical Society

Pyroxene Fs mean	All Dialogs*	<, ≤, >, ≥	the pyroxene ferrosilite arithmetic mean value of a number of individual measurements or a single value if just one value is reported. The value is given in mole %. For chondrites, this is normally the value for the orthopyroxene phase	(0.1-99.9)
Pyroxene Fs range	All Dialogs*	<, ≤, >, ≥	the range of pyroxene ferrosilite [mole %] with the lowest and highest values obtained in the measurement. For chondrites, these are normally the values for the orthopyroxene phase	(0.1-99.9)
Pyroxene Fs stddev.	All Dialogs*	<, ≤, >, ≥	the statistical standard deviation (±1σ) of the pyroxene ferrosilite values. For chondrites, this is normally the values for the orthopyroxene phase	(>0.01)
Record-ID	Literature Survey	=, <, ≤, >, ≥	each reference record is given a unique ID code of 8-digit length	C0001200
Ref-Code	Literature Survey	=, IN	same field tpye as the „Reference Symbol“ indicating the presence of analysis data in another MetBase database section	KING ,78
Reference	Repository Overview	LIKE	the reference citation (for publication with author, year, title, source) for the used information on repository / meteorite collection (usually catalogues or publications in journals). The field is left blank if the source of information is an unpublished inventory list or is based on private communications	Catalogue of Meteorites
Reference	Literature Survey	=, LIKE	the bibliographic source of the given literature reference is provided	ADS Abstract Service
Reference Symbol	Bulk Chemical Analyses Noble Gas Isototpes Trace Elements/Stones Trace Elements/Irons Light Stable Isotopes TL Data Physical Properties	=, IN	a character string of fixed lengh (10 digits) indicating the literature source of the given analysis data, with the first 6 digits reserved for the first author, the seventh digit a comma, and the last 3 digits reserved for the year of publication (e.g., “EBERHA,66A” or “KING ,78”). Look under “Analysis References” in the “Report Dialog” to display the detailed reference text	KING ,78
Reference Symbol, CNG	Cosmogenic Nuclides	=, IN	the same like field “Reference Symbol“, but to be used for retrieval of the references for cosmogenic noble gas data, only.	HERZOG,74A
Reference Symbol, CRN	Cosmogenic Nuclides	=, IN	the same like field “Reference Symbol“, but to be used for retrieval of the references for cosmogenic radionuclides and terrestrial ages, only	HERZOG,74A
Reference Text, Detailed	Bulk Chemical Analyses Noble Gas Isototpes Trace Elements/Stones Trace Elements/Irons Light Stable Isotopes TL Data Physical Properties	LIKE	text of variable length. The detailed reference to the analysis data is given with authors, year, title, and source. Only in this field you can retrieve information on co-authors of the referenced literature	Chemical variation
Reference Text, CNGs	Cosmogenic Nuclides	LIKE	the same like field “Reference Text, Detailed“, but for retrieval of the references for cosmogenic noble gas data, only	Exposure Age
Reference Text, CRNs	Cosmogenic Nuclides	LIKE	the same like field “Reference Text, Detailed“, but to be used for retrieval of the references for cosmogenic radionuclides and terrestrial ages, only	size effects

Remarks	Literature Survey	LIKE, =	further details and references are given (e.g., the conference name, place and date for presented papers or abstracts)	Paper presented at the 10th Lunar...
Repositories, Material	All Dialogs*	LIKE	a list of repositories of specimens of the specific meteorite, in which each line contains the total specimen weight (if known) in the repository, the repository code with city and abbreviation of the institution, and, sometimes, specimen remarks (e.g., "main mass")	Vienna, Naturhist. Mus.
Repositories, Sections	All Dialogs*	LIKE	a list of repositories of prepared sections of the specific meteorite, in which each line contains the repository code with city and abbreviation of the institution, and the kind of section as an acronym, set in brackets (e.g., "(PTS)" for polished thin section)	Mainz, Max-Planck-Inst.
Repository Name	Repository Overview	LIKE	the name of the repository, normally an institute or museum	Mineralogisches Museum
Sample Designation	Bulk Chemical Analyses Trace Elements/Stones Trace Elements/Irons Cosmogenic Nuclides Light Stable Isotopes TL Data Physical Properties	LIKE, =	the sample identification number and further details to the type of sample used for the analysis	FMNH Me 14
Sample Material	Bulk Chemical Analyses Noble Gas Isototpes Trace Elements/Stones Trace Elements/Irons Cosmogenic Nuclides Light Stable Isotopes TL Data Physical Properties	=, ==, IN	up to two letters indicating the sample material type used in the analysis (B = bulk sample, SE = separate (clast, chondrule, size-fraction...), MA = magnetic separate, NM = nonmagnetic separate, ME = metal, MR = metal-rich fraction, MS = mineral separate, SI = silicate)	SE
Sample Remarks	Noble Gas Isotopes	LIKE, =	remarks to noble gas analysis sample as reported in the cited literature, like sample no., mineral fraction, irradiation remarks (e.g., NI = neutron irradiated), etc. For more information, consult to the original publication	NI irradiated
Selected Count	Annual Falls/Finds		the number of meteorites (including pairings) that were found in the specific year. Only those meteorites are included in the count, that match the selection criteria. If no condition for selection was fixed, the number is equal to the number stored in the "Total Count" field. This field is temporarly created during the query and can be used for ordering of records.	(≥0)
Selected Weight Sum	Annual Falls/Finds		the total weight sum in kg of all meteorites that were found in the specific year. Only those meteorites are included in the calculation, that match the selection criteria. If no condition for selection was fixed, the number is equal to the number stored in the field "Total Weight Sum". This field is temporarly created during the query and can be used for ordering of records.	(≥0.001)
Series	Literature Survey	=, <, ≤, >, ≥	A serial number is given in some cases where journal issuing was subsequently changed to a new volume numbering	(≥1)
Shock Classification	All Dialogs*	=, IN	the shock classification symbol or facies (e.g., "S4" or "d"). The available shock classifications can be retrieved from the Symbols browse window.	S6 d
Shock Stage *S1 - S6*	Shock Classifications		the number of retrieved meteorites having the specific shock classification. This field is	(≥0)

			available for ordering of reports, only	
Specimen Remarks	Collection Information	LIKE, =	remarks to meteorite specimens in a specific repository, like “main mass” or a synonym under which the meteorite is listed in the catalogue	main mass
State	All Dialogs*	=, IN	the name of the state or region in which the meteorite was located	Texas
Structural Type Symbol	All Dialogs*	=, ==, IN	a symbol indicating the structural type of the meteorite (e.g. “Om”, “Off”, “D”, “H”,... for iron meteorites, “ACH” for achondrites, “CH” for chondrites). For the chondrites another letter is appended to “CH” that further specifies the type (“C” for “carbonaceous”, “E” for “enstatite”, “O” for “ordinary”, “U” for “unequilibrated”, and so on). This field is left blank in case of pallasites or mesosiderites. The available symbols are listed in the Symbols window.	CHO Off D
Synonyms	All Dialogs excluding Analyses Data Queries	LIKE	text of variable length. The known synonyms of the specific meteorites are listed in this field.	Gnarrenburg Bremervorde
Terrestrial Age (ka)	Cosmogenic Nuclides	<, ≤, >, ≥	the terrestrial age of the meteorite, calculated from the ^{14}C or ^{36}Cl radionuclide data	(≥0)
Time (2315)	All Dialogs*	<, ≤, >, ≥	the time of the meteorite fall observation. Normally, the time is the local time of the place of fall (e.g., “23:55hrs”. If a standard time is reported, this is indicated (e.g. “UT” for “Universal Time”). If the exact time was not reported, but the daytime, this is indicated (e.g. “nighttime”, “at dawn”,...).	2315
Title	Literature Survey	LIKE, =	the full title of the literature reference. Search for a character string in the title. In case of non-English titles, the title is often given in the language as published, with an english translation set in brackets behind. In other cases, only the English translation is supplied	Petrology and mineralogy of...
Total (wt.%)	Bulk Chemical Analyses	<, ≤, >, ≥	the sum value of all anayzed chemical components (ideally = 100%). Is an indication for the consistency of the analysis	(90-105)
Total Count	Annual Falls/Finds		the total number of meteorites (incl. all pairings) recovered in the specific year. This field is temporarly created and can be used for ordering of the records. (compare with “Selected Count”)	(≥1)
Total Count (Shock stage)	Shock Classifications		the total number of selected shock classification for a specific meteorite main type	(≥1)
Total Iron [wt.%]	All Dialogs*	<, ≤, >, ≥	the total iron content of the meteorite bulk material (in weight percentage)	(0.0-99.9)
Total Known Weight (kg)	All Dialogs*	<, ≤, >, ≥	the total weight of all known specimens of the meteorite in kilograms. If the weight at time of recovery is not reported, the total weight known in collections is given	(≥0.00001)
Total Weight Sum	Annual Falls/Finds		the calculated total weight sum in kg of all meteorites (including all pairings) recovered in the specific year. This field is temporarly created during the query and can be used for ordering of records. (compare with field “Selected Weight Sum”)	(≥0.001)
Volume	Literature Survey	=, <, ≤, >, ≥	The volume number of the referenced publication (journals and conference papers only)	(≥1)
Weathering Category	All Dialogs*	=, ==, LIKE, NOT LIKE	the weathering category is an expression or number that indicates the stage of degradation (or weathering) of a meteorite find (e.g., “A”, “B/C”, or “3”). Lierature references to the classification can be found in field “Detailes & References”. The available weathering	A/Be W0/1

			categories are listed in the Symbols browse window	
Weight in Collection [g]	Collection Information	<, ≤, >, ≥	the weight of material of a meteorite in a specific repository in grams. If more than one specimen is reported, the individual weights figures are reduced to a total	(≥0.1)
Year	All Dialogs*	=, <, ≤, >, ≥	the year of meteorite recovery. If the year of find is unknown, the year of recognition as a meteorite is given	1894
Year (Bibliography)	Literature Survey	=, <, ≤, >, ≥	the publication year of is given	1998
Year of Information	Repository Overview	=, <, ≤, >, ≥	the year in which the collection inventory used as reference was done (in case of publication in a journal or catalogue, the year of publication)	1995
Year of Publication	Bulk Chemical Analyses Noble Gas Isototpes Trace Element Data	=, <, ≤, >, ≥	the publication year of the literature reference for the analysis data	1995
Year of Publication, CNG	Cosmogenic Nuclides	=, <, ≤, >, ≥	the publication year of the literature reference for the cosmogenic noble gas data data	1995
Year of Publication, CRN	Cosmogenic Nuclides	=, <, ≤, >, ≥	the publication year of the literature reference for the cosmogenic radionuclide data and terrestrial ages	1995

* excluding Repository Overview and Literature Survey